Assessing the extent and effectiveness of diabetes self-management education in public health care institutions in Harare, Zimbabwe

by
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DECLARATION

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ABSTRACT ENGLISH

Introduction

Nutrition focused diabetes self-management education (DSME) provided by a dietitian or diabetes educator considerably improves glycaemic control, reduces the rate of complications, and reduces costs. Little is known about the effectiveness of DSME interventions, despite the rising prevalence of type 2 diabetes (T2DM) in Harare. This study therefore aimed to assess the extent to which existing DSME interventions improve nutrition focused knowledge, attitudes and practices (KAP). Secondly, health facility resoures to support effective DSME were assessed.

Methods

A cross sectional survey design was used to determine nutrition focused diabetes KAP for 156 participants with T2DM attending eight public health facilities within the Harare metropole. The final sample size detected an effect size of 0.4 between two groups perceived to differ with regard to DSME received, i.e. central hospital outpatient clinic attendees and city health clinic attendess. Two (out of two) central hospital clinics in Harare were selected and six city health clinics (representing six of nine health districts in Harare) were selected using a multiple stage sampling strategy. Participants were divided equally between the two groups. Mean KAP scores from a reseacher designed questionnaire were compared between clinic groups, consultation with a dietitian and a diabetes educator. Nineteen health professionals involved in diabetes management at the sampled facilities also completed a self assessment on the primary care resources available to deliver quality DSME at their respective clinics.

Results

The majority of participants (90.3%, n=139) reported recieving DSME, while fewer had consulted a dietitian (49.0%, n=76) or diabetes educator (52.0%, n=80). Dietitian ($\chi2=10.61, p=0.01$) and diabetes educator ($\chi2=12.31, p=0.00$) led interventions occurred more frequently at central hospitals. Participants showed better knowledge ($p<0.01$), and attitudes ($p<0.00$) for other self-care behaviours compared to nutrition knowledge ($p<0.01$).

Significantly higher levels of knowledge were observed for central hospital clinic atendees (p=0.00), consultation with a dietitian (p<0.01) or diabetes educator (p=0.00). However, no differences were observed in attitudes for clinic group (p=0.10), consultation with a dietitian (p=0.30) or diabetes educator (p=0.19). Only those that had consulted a dietitian reported better adherence to dietary guidelines (p=0.00) and physical activity (p=0.02) self-care behaviours. Over half of the health professionals (57.9%, n=19) and (68.4%, n=19) scored resources for patient and organisational support respectively as inconsistent and limited. Health professionals from city health clinics rated their patient (p<0.01) and organisational (p<0.01) support capacity higher than health professionals from central hospital clinics.

Conclusion

DSME intervention occurs more frequently at central hospitals, although no evidence of structured DSME programmes exists. Only dietitian led interventions significantly improved both knowledge and practices, highlighting a need to scale up dietetic intervention, particularly in city health clinics were very little DSME occurs. Health professional perceived resources for DSME to be inadequate and inconsistent, revealing the need for improved training of health professonals involved in diabetes management.

ABSTRAK AFRIKAANS

Inleiding

Voeding-gefokusde opleiding omDiabetes self te kan bestuur [*Diabetes self-management education* (DSME)] wat verskaf word deur ‘n dieetkundige of diabetes-opvoeder verbeter glisemiese kontrole, verlaag die voorkoms van komplikasies en verlaag koste aansienlik. Nieteenstaande die stygende prevalensie van diabetes in Harare, is daar relatief min inligting beskikbaar aangaande die effektiwiteit van DSME intervensies. Hierdie studie het dus ten doel gehad om die effek van DSME intervensies op verbetering van voeding-gefokusde kennis, houding en praktyke te bepaal. Tweedens is die hulpbronne van gesondheidsorginstansies vir die ondersteuning van effektiewe DSME bepaal.

Metodes

‘n Dwarssnit studie ontwerp is gebruik om voeding gefokusde diabetes kennis, houding en praktyke van 156 deelnemers met T2DM, wat agt publieke gesondheidsorginstansies in die Harare metropool besoek, te bepaal. Die finale steekproef kon ‘n effekgrootte van 0.4 tussen die twee groepe wat vermoedelik verskil ten opsigte van DSME ontvang, naamlik sentrale hospitaal kliniek pasiënte en stads gesondheidskliniek pasiënte bepaal. Twee (uit twee) sentrale hospitaal klinieke in Harare en ses stads gesondheidsklinieke (wat ses uit die nege gesondheids distrikte verteenwoordig) was geselekteer deur middle van ‘n veelvuldige stadium steekproefstrategie. Deelnemers was gelyk verdeel tussen die twee groepe. Gemiddelde kennis, houding en praktyke (nakoming) tellings van ‘n navorser-ontwikkelde vraelys is vergelyk tussen kliniek groepe, konsultasies met ‘n dieetkundige en ‘n diabetes-opvoeder. Negentien gesondheidswerkers betrokke by diabetes bestuur by die geselekteerde fassiliteite het ook ‘n self-evaluasie van primêre sorg hulpbronne beskikbaar by die klinieke vir lewering van kwaliteit DSME voltooi.

Resultate

Die meerderheid deelnemers (90.3%, n=139) het aangedui dat hul blootstelling gehad het aan DSME, terwyl ‘n kleiner persentasie ‘n dieetkundige (49.0%,n=76) of diabetes-opvoeder (52.0%,n=80) besoek het. Dieetkundiges ($\chi2=10.61,p=0.01$) en diabetes-opvoeder ($\chi2=12.31,p=0.00$) intervensies het meer algemeen voorgekom by sentrale hospitale.

Deelnemers het beter kennis ($p<0.01$) en gedrag ($p<0.00$) getoon vir ander selfsorgpraktyke vergeleke met voedingkennis ($p<0.01$). Deelnemers wat sentraal hospitaalklinieke ($p=0.00$), ‘n dieetkundige ($p<0.01$) of diabetes-opvoeder ($p=0.00$) besoek het, het almal hoër kennisvlakke getoon. Geen verskille is gevind in houding vir kliniek groep ($p=0.10$), of konsultasie met ‘n dieetkundige ($p=0.30$) of diabetes-opvoeding nie ($p=0.19$). Slegs diegene wat ‘n dieetkundige konsulteer het, het beter navolging van dieet ($p=0.00$) en fisiese aktiwiteit ($p=0.02$) selfsorg-gedrag rapporteer. Meer as die helfde van die Gesondheidswerkers (57%, n=19) en (68.4%, n=19) het hulpbronne vir pasiënt- en organisatoriese ondersteuning onderskeidelik, aangedui as beperk. Gesondheidswerkers van stads gesondheidsklinieke het hul pasiënt- ($p<0.01$) en organisatoriese ($p<0.01$) ondersteuning vermoeë hoër geag as diegene van sentrale hospitaal klinieke.

Gevolgtrekking

DSME intervensie gebeur meer gereeld by sentrale hospitaal klinieke, alhoewel daar geen bewyse van gestruktureerde DSME programme bestaan nie. Slegs intervensies gelewer deur dieetkundiges het tot beduidende verbetering in kennis en praktyke aanleiding gegee. Laasgenoemde versterk die behoefte om dieetkundige intervensies te verbeter, veral by stads gesondheidsklinieke waar weinige DSME plaasvind. Gesondheidswerkers het sekere aspekte van DSME as onvoldoende geag, wat die behoefte versterk om gesondheidswerkers voldoende op te lei in diabetes hantering.

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On a personal note, I would like thank my parents and siblings. You have been there, loving and supporting me for my entire life. My accomplishments from the time I learnt to spell my name to now would not have been without you. Thank you! Finally, but certainly not least, I would like to thank my Heavenly Father for giving me the strength to get through this.

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LIST OF ABBREVIATIONS

AADE	American Association of Diabetes Educators
ADA	American Diabetes Association
ADVANCE	Action in Diabetes and Vascular Disease
ACIC	Assessment of Chronic Illness Care
BMI	Body mass index
CCM	Chronic care model
CVD	Cardiovascular disease
DAS	Diabetes Attitude Scale
DAWN	Diabetes Attitudes Wishes and Needs study
DCCT	Diabetes Control and Complications trial
DCP	Diabetes Care Profile
DM	Diabetes mellitus
DKT	Diabetes Knowledge Test
DSME	Diabetes selfmanagement education
DSMS	Diabetes self management support
DSMT	Diabetes self management training
DRI	Daily Recommended Intake
EDIC	Epidemiology of Diabetes Interventions and Complications
HREC	Health Research Ethics Committee (Stellenbosch University)
HbA1c	Haemoglobin A1c
HBM	Health belief model

IDF	International Diabetes Federation
IL 6	Interleukin 6
IRB	Institutional review board
JREC	Joint Research Ethics Commitee (University of Zimbabwe and Parirenyatwa Hospital)
MNT	Medical nutrition therapy
MRCZ	Medical Research Council of Zimbabwe
MOHCC	Ministry of Health and Child Care
MI	Myocardial infarction
NCBDE	National Certification Board for Diabetes Educators
NCD	Non communicable disease
OPD	Outpatient department
PCRS	Primary Care Resources and Supports for Chronic disease self-management
RD	Registered dietitian
ROS	Reactive oxygen species
SDSCA	Summary of Diabetes Self-Care Activities
SEMDSA	Society for Endocrinology, Metabolism and Diabetes of South Africa
SMBG	Self-monitoring of blood glucose
T2DM	Type 2 diabetes mellitus
T1DM	Type 1 diabetes mellitus
TLC	Therapeutic lifestyle changes
TNF	Tumour necrosis factor

TRA	Theory of reasoned action
UKPDS	United Kingdom Prospective Diabetes Study
VADT	Veterans Affairs Diabetes Trial
WHO	World Health Organization
ZDA	Zimbabwe Diabetes Association
ZDHS	Zimbabwe Demographic and Health Survey

CHAPTER ONE

LITERATURE REVIEW

1.1 INTRODUCTION

There is substantial evidence to support the effectiveness of diabetes self-management education (DSME) in improving clinical and psychosocial outcomes in people with type 2 diabetes mellitus (T2DM).[1-5] Type 2 diabetes mellitus is a chronic, progressive condition, which requires one to adopt self-care behaviours that are consistent with optimal glucose control.[6,7] People with diabetes must first acquire the requisite knowledge to perform self-care behaviours. Intrinsic factors (attitudes) that affect the willingness to adopt self-care behaviours are important predictors of behaviour change.[8-10]

Evidence suggests that DSME in low resourced settings is sporadic and not consistent in objectives, scope and structure.[11] Moreover, the lack of policy and documentation for DSME processes make it difficult to ascertain the extent of DSME in low-income countries such as Zimbabwe.[11,12] This study, therefore, sought to use a non-interventional design to determine the effectiveness of existing DSME services with a focus on nutrition in selected public outpatient clinics in Harare. This was achieved through the administration of a questionnaire to T2DM clinic attendees in order to determine the knowledge, attitudes and practices regarding their condition. The null hypothesis was that people with T2DM who received DSME would not have significantly different levels of knowledge, attitudes and practices compared with those that did not receive DSME. Furthermore, the extent of DSME services was assessed through the Primary Care Resources and Supports for Chronic Disease Self-Management (PCRS) tool.[13]

The literature overview provides a detailed description of diabetes as a growing public health concern in Zimbabwe and indicates the relevance of DSME and medical nutrition therapy (MNT) in mitigating the impact of diabetes. The review summarises the foremost available evidence in regard to DSME, MNT and primary care resources for DSME.

1.2 PREVALENCE OF DIABETES

1.2.1 Global prevalence

The World Health Organization (WHO) estimates that globally, diabetes will be the seventh leading cause of death by 2030.[14,15] Despite Africa contributing the least to the

global burden of diabetes (5.6% of the global diabetes population), the continent has the highest percentage of undiagnosed diabetes worldwide.[16,17]

1.2.2 Prevalence of diabetes in Zimbabwe

According to the International Diabetes Federation (IDF), Zimbabwe is in the top ten African countries regarding diabetes burden, with a national prevalence of 8.5%.[18] To date, a representative national survey on the prevalence of diabetes has not been conducted.[19] Hakim et al. estimated the prevalence in Zimbabwe to be at 10% based on a sample from three of the ten provinces in the country.[20] A recent meta-analysis by Mutowo et al. estimated a national prevalence of 5.7%.[19] Despite discrepancies in prevalence estimates, a clear trend in the rising prevalence has been observed.[18,19,20]

1.2.3 Prevalence of diabetes in the city of Harare

In the local government clinics in the City of Harare, diabetes was reported to be among the top six causes of mortality between the periods 2011 to 2012 and 2012 to 2013.[21,22] The City of Harare is divided into nine administrative and health districts. Each health district has up to six clinics. The statistics in Figure 1-1 show the number of patients with diabetes per health district in 2013.[22]

Between 2011 to 2012 and 2012 to 2013, there was respectively a 32.2% and a 21.9% rise in the attendance of patients with diabetes at primary care clinics.[21,22] As shown in Figure 1-1, more patients with diabetes were seen in high¬ density areas such as the western districts of Harare compared with the lower density areas such as the northern and eastern districts.[21,22]

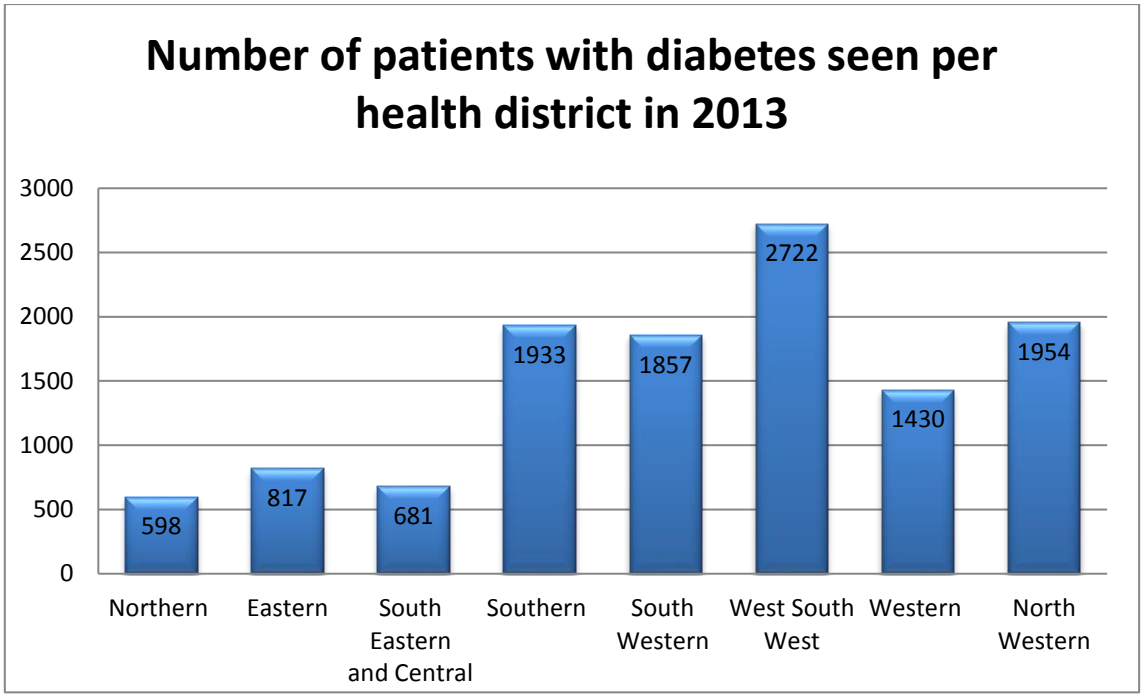


Figure 1-1: Attendance of diabetes patients at primary health care facilities in Harare Source:(22)

1.3 DIABETES DEFINITION AND PATHOPHYSIOLOGY

Diabetes mellitus (DM) is characterised by increased blood glucose concentrations due to an impaired ability of the pancreas to produce insulin or an impaired ability to utilise insulin effectively.[23] It is thought that both these defects contribute to T2DM; however, the extent to which each factor contributes is unclear.[23,24] Hyperglycaemia is a distinctive feature of all types of diabetes and is the most significant contributor to vascular damage.[25] Type 2 diabetes mellitus is by far the most prevalent form of diabetes, accounting for 90% of cases globally.[14,15] There are multiple risk factors for the development of T2DM, which can be grouped into genetic and environmental risk factors. Figure 1-2 shows the interactions of various environmental and genetic risk factors that contribute to the pathogenesis of T2DM through insulin resistance and beta cell dysfunction. Genetic risk factors include abnormalities in the regulation of glucose.[26] Environmental risk factors include advanced age, obesity, excessive caloric intake and inactivity.[14,15,24,26, 27]

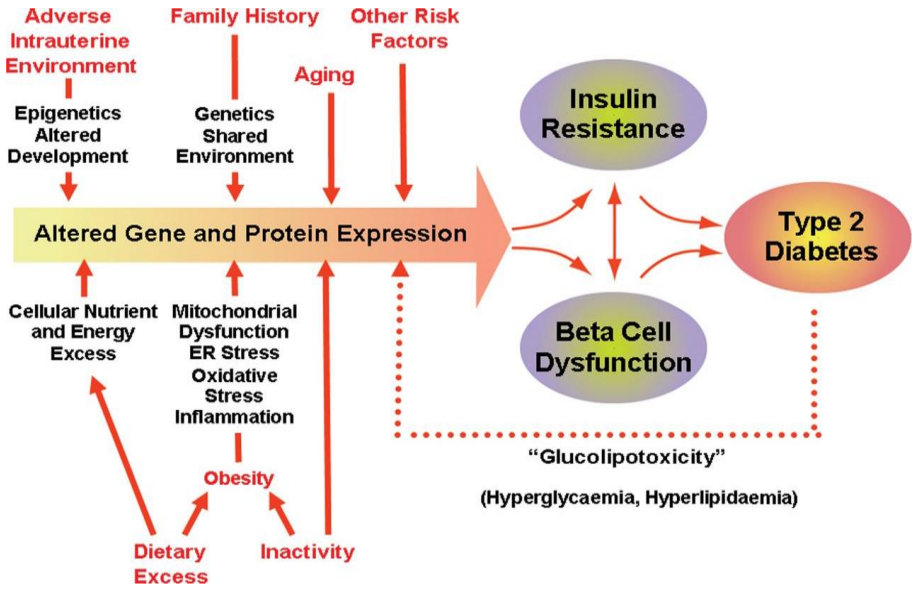


Figure 1-2: Illustration of the multiple risk factors that contribute to pathogenesis of T2DM
Source: (28)

1.3.1 The role of overweight and obesity

Body mass index (BMI) is strongly correlated with insulin resistance and the development of diabetes.[24,26-29] Moreover, obesity and overweight are highly associated with a phenomenon known as metabolic syndrome, which is characterised by a collection of symptoms and risk factors that predispose one to chronic conditions such as diabetes, hypertension and cardiovascular disease.[26] Metabolic syndrome is defined as having three of the following conditions: central obesity, elevated triglycerides, hypertension, elevated fasting plasma glucose and low levels of high-density lipoproteins (HDL).[30]

Recent findings have demonstrated that adipose tissue functions as an endocrine organ that secretes hormones known as adipokines (e.g. leptin, ghrelin, resistin and adiponectin).[31] These hormones have been shown to be involved in the regulation of metabolism, particularly affecting insulin action, fat metabolism and levels of inflammation.[24,31] The levels of pro-inflammatory cytokines such as tumour necrosis factor (TNF) and interleukin 6 (IL 6) are increased in obesity and result in increased oxidative stress (increased production of reactive oxygen species (ROS)) and low grade inflammation, frequently described in obesity literature.[23,31,32,33] Oxidative stress is linked to increased insulin resistance, hyperinsulinemia and the progressive decline in

beta cell mass.[32,33] Insulin resistance can persist for many years without the manifestation of impaired glucose tolerance owing to the ability of the pancreas to offset resistance by increasing the production of insulin.[23] However, over time, the beta cells of the pancreas become 'exhausted', and insulin production can no longer be sustained at the high levels required to overcome resistance, which leads to the manifestation of hyperglycaemia.[23,24] Hyperglycaemia, in turn, drives the production of ROS and reduces antioxidant defense systems.[33]

1.3.2 Perinatal risk factors for diabetes

Maternal over- and undernutrition during pregnancy are strongly linked to a predisposition for chronic disease (diabetes, cancer, cardiovascular diseases, etc.) phenotypes in the offspring.[34,35] Maternal undernutrition during foetal development results in insulin resistance and reduced beta cell mass and islet cell function.[35,36] Aging and changes in environmental factors in favour of excessive caloric intake and adiposity further drives oxidative stress, inflammation and insulin resistance.[35,36,36,37] The hypothesis that attempts to explain how undernutrition in early life can predispose to chronic diseases such as diabetes later on in life is known as the thrifty phenotype hypothesis.[35,36]

Maternal high calorie/fat diets have been shown to increase adiposity and inflammation in offspring.[36] Leptin is a hormone that is responsible for regulating appetite, regulating energy expenditure and maintaining energy balance. There is evidence to suggest that increased circulating levels of maternal leptin and insulin induced by excessive caloric intake may result in decreased leptin and insulin sensitivity in the offspring and an increased risk of obesity.[36]

1.4 COMPLICATIONS OF DIABETES

The link between poorly controlled diabetes and the rates of developing complications of diabetes has been established in several landmark studies.[37-41] The effects of hyperglycaemia in the body have traditionally been described as a diverse spectrum of vascular-related conditions that are divided into two main subtypes: macrovascular complications (coronary artery disease, peripheral artery disease and strokes); and microvascular complications (diabetes nephropathy, neuropathy and retinopathy).[26]

The risk of developing either of these complications is highly associated with the duration and severity of hyperglycaemia.[26] Glucose control, as measured by the haemoglobin A1c (HbA1c) test, is a strong predictor of the development of diabetes complications.[38,39,42,43] The American Diabetes Association (ADA) consensus guidelines recommend an HbA1c target of below 7.0% in people with diabetes.[44] Individualised therapy targets are permissible based on clinician judgement.[45]

1.4.1 Cardiovascular complications

The risk of cardiovascular disease (CVD) mortality in T2DM patients is more than double compared with non-diabetes, age-matched subjects.[46,47] Increased levels of small, low-density lipoprotein (LDL) particles and triglycerides, matched with decreased levels of high-density lipoproteins (HDL), are characteristics seen in the majority of people with chronic hyperglycaemia.[48] Furthermore, the inflammatory state of diabetes predisposes to oxidative stress and hypercoagulability, which in turn, increases the risk of ischemic cardiovascular events. Cardiovascular disease (coronary artery disease and cerebrovascular diseases) are the leading non-communicable causes of morbidity and mortality in the world.[49] Data from Africa, although scarce, suggest that diabetes is present in at least one in three patients that present with coronary artery events.[49,50] In Zimbabwe, epidemiological data from hospital admission statistics and mortality trends show an increasing prevalence of CVD.[51]

1.4.2 Diabetes retinopathy

Diabetes is among the leading causes of visual impairment and blindness globally.[14,52] An African systematic review that included 62 studies in 21 countries estimated the prevalence of retinopathy to range between 30.3% and 31.6%.[52] However, a lack of standardisation in the diagnosis of retinopathy across studies and over representation of data from some countries were cited as limitations to the representativeness of the systematic review.[52] A clinic-based survey conducted at Parirenyatwa hospital outpatient department reported a diabetes retinopathy prevalence of 26.1%.[53] In a national newspaper article published in 2015, the national ophthalmologist and the WHO reported that at least 5 000 people go blind annually in Zimbabwe due to complications of diabetes.[54]

1.4.3 Diabetes nephropathy

Diabetes kidney disease is the leading cause of renal failure globally.[25,55,56] Proteinuria, which characterises nephropathy, is preceded by the appearance of low levels of albumin in the urine (microalbuminuria).[25,56] Without intervention, a sustained increase in the urinary excretion of albumin eventually leads to nephropathy.[25,57] The ADA estimates that the prevalence of microalbuminuria and proteinurea may be as high as 10% in newly diagnosed T2DM.[56,58] A systematic review on diabetic nephropathy in Africa reported a prevalence of 11% to as high as 83.7% in some settings.[59] Similar limitations as stated in the reviews on retinopathy were reported, that is, lack of population-based studies and differences in methodologies of measuring kidney function.[59] A small study of 75 insulin-dependent diabetes patients at Parirenyatwa Hospital in Zimbabwe reported a nephropathy prevalence rate of 33%.[60]

1.4.4 Diabetes neuropathy

Neuropathies may affect an estimated 50% of people with diabetes.[61-63] Accurate prevalence estimates are not known owing to the lack of consensus on a definition and diagnostic tests.[61] Diabetes neuropathy is, therefore, best described as "the presence of symptoms and/or signs of peripheral nerve dysfunction in people with diabetes after the exclusion of other causes."[62,63] As a result, neuropathy can manifest as many abnormalities such as gastro-intestinal and dermatological abnormalities.[55,62,64] It is estimated that diabetes-related neuropathies account for more hospitalisations when compared with all other complications of diabetes and are responsible for up to 75% of non-traumatic amputations.[63] Insufficient evidence has been gathered on the prevalence of neuropathy in the African setting. However, prevalence in various clinic-based settings ranges from 26–68% across African countries.[65]

1.5 BENEFITS OF TIGHT BLOOD GLUCOSE CONTROL

Several landmark observational and clinical trials have shown that good/improved glycaemic control is associated with reduction in the rates of complications of diabetes.[1, 37-41,66] The Diabetes Control and Complications Trial (DCCT) was one of the first large trials (1 441 patients) to show that tight blood glucose control delayed the progression of microvascular complications in people with type 1 diabetes mellitus (T1DM).[66,67] The Epidemiology of Diabetes Interventions and Complications (EDIC) study

was a follow-up to the DCCT on the same cohort between 1994 and 2006. The EDIC study showed a 42% reduced risk of any CVD event, while non-fatal heart attack, stroke or death from CVD was reduced by 57% with tight glycaemic control.[67-69] The United Kingdom Prospective Diabetes Study (UKPDS) demonstrated longer term effects with good glycaemic control, with a follow-up period of ten years compared with 6.5 years as stated in the DCCT.[1,37,67,70] In the UKPDS, microvascular complications were significantly reduced by 25%. However, reductions in macrovascular complications missed the significance mark (16%, p=0.052).[1,70]

More recent trials, the Action in Diabetes and Vascular Disease trial (ADVANCE, 2008) and the Veterans Affairs Diabetes Trial (VADT, 2009) also demonstated no significant reductions in macrovascular complications with tight blood glucose control.[40,41] In both studies, a mean HbA1c of below 7% was achieved in the intervention arms.[40,41] A third study, the Action to Control Cardiovascular Risk in Diabetes (ACCORD, 2008), reported more deaths in the intensive treatment group (mean HbA1c of 6.4% achieved) compared with the standard treatment group.[71] Reasons for the increased death rate are not known. However, it is thought that hypoglycaemia may be a contributory factor.[71] Based on the results, the intensive treatment group was halted since the researchers reported that risks of euglycaemia may outweigh the benefits.[71,72] There are certain very important differences between the more recent trials (ADVANCE, ACCORD, VADT) and the UKPDS and DCCT that may explain why tight glycaemic control did not appear to be as beneficial in the earlier trials. The first is that participants in the recent trials were at higher risk of CVD owing to advanced age and longer duration of diabetes. Indeed, in the VADT, 40% had already had a CVD event, the mean number of years since diagnosis was 11.5 and the participants had a history of poor glycaemic control.[40] This could partly explain why tight blood glucose control is not as effective as when it is achieved from diagnosis, such as in the UKPDS and DCCT trials.[40,41,68] Hence, tight blood glucose control is likely most beneficial when implemented at onset of diabetes compared with implementation at later stages.[70,73]

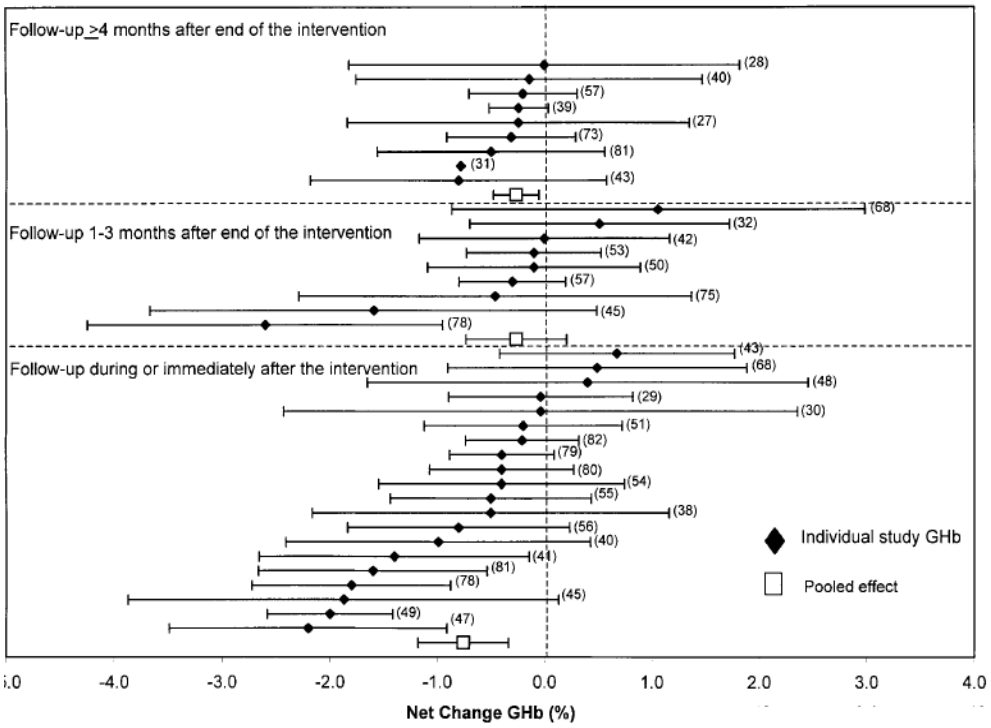
1.6 DIABETES SELFMANAGEMENT EDUCATION

1.6.1 Defining diabetes self-management education

Diabetes requires a person to make daily decisions in regard to food choices, exercise and medication use. In consideration of these demands, DSME has been defined as an ongoing process of facilitating the transfer of knowledge and skills necessary for optimal diabetes self-care.[6,7] The IDF outlined the purpose of DSME as being "to support patients to make informed decisions, cope with the daily demands of self-management and support patients in adopting self-care behaviours that are evidence based".[5] Diabetes self-management education is, therefore, an active process that takes into consideration the needs, goals and life experiences of the person with diabetes.[6,74]

1.6.2 Benefits of diabetes self-management education

Effective DSME has a positive impact on psychosocial factors (diabetes-related stress and depression) and clinical factors.[2-4,75] Diabetes self-management education may reduce HbA1c by as much as 1%, with the most significant change observed in the first two months after a DSME intervention.[1-4] The results of a meta-analysis of 31 randomised control trials showed that in the first 1.5 months after DSME was employed as an intervention, HbA1c decreased by a mean of 0.76% (95% CI, 0.34–1.18) when compared with the control groups.[76] Glycated haemoglobin (HbA1c) decreased by a further 0.26% (95% CI, 0.05–0.48) four months after the intervention and hence, the overall pooled effect favoured the net reduction of HbA1c shown in Figure 1-3.[76] This is consistent with data from two systematic reviews that showed that DSME activities are associated with a statistically significant reduction in mean glycated haemoglobin.[77,78]



gure 2—*GHb, stratified by follow-up interval. Net change in GHb is shown for each individual study, with lines extending from the symbols presenting 95% CIs. Pooled results are for each follow-up interval, with r = 0.5.*

Figure 1-3: Forrest plot showing evidence supporting beneficial effect of diabetes self-management education on glycaemic control

Source: (76)

The duration of DSME interventions, the frequency of education and the advanced expertise of the educator are all factors that have demonstrated to improve the quality of DSME.[76-79] Norris et al. found that every 23.6 hours of contact between a diabetes educator and a patient resulted in a 1% drop in HbA1c.[77] More recent reviews have demonstrated that DSME that is directed at behaviour change (using techniques such as motivational interviewing) rather than only focusing on imparting knowledge, leads to more sustained reductions in HbA1c.[79,80] Furthermore, individualised education compared with group education has shown to have more enduring effects on HbA1c.[76,79] However, the practicality of intensive one-on-one education must be brought into question in countries such as Zimbabwe that experience a severe shortage of health professionals.[81] Nevertheless, any reduction in HbA1c has significant clinical implications.[1,37]

Effect of diabetes education on knowledge and practices

A systematic review of 20 randomised control trials, by Norris et al that assessed knowledge as an outcome demonstrated improved knowledge in all the studies.[77]

However, pooling studies together in this area is a challenge because different tools were used to assess knowledge and in many cases, the tools were not validated.[77,82] In regard to self-care skills, 11 of 13 studies included in the Norris et al systematic review demonstrated a statistically significant change in self-reported dietary habits.[77] Reductions in carbohydrate and fat intake were observed in four studies, while weight loss was reported in only two studies. The effect of DSME on increasing physical activity is less predictable. Almost one-half of the studies in two systematic reviews showed that physical activity interventions are not maintained in the long term.[77,78]

1.6.3 Content of diabetes self-management education

The American Association of Diabetes Educators (AADE) has organised the content of DSME into the curriculum topics shown in Table 1-1.[83] The curriculum covers the pathophysiology of diabetes, glucose lowering medications, self-monitoring for day-to-day decision-making, physical activity, healthy eating, reducing risks and problem-solving.[83] The curriculum must also address the prevention and management of chronic and acute complications of diabetes. Education must equip the person with diabetes with the skills necessary to develop personal strategies of coping and effecting health behaviour changes in addition to addressing psychosocial issues.[83,84]

Table 1-1: Curriculum guidelines for American national standards of diabetes self-management education

Recommended Curriculum Topics
Describing the diabetes disease process and treatment options
Incorporating nutritional management into lifestyle
Incorporating physical activity into lifestyle
Using medication(s) safely and for maximum therapeutic effectiveness
Monitoring blood glucose and other parameters and interpreting and using the results for self-management decision-making
Preventing, detecting and treating acute complications
Preventing, detecting and treating chronic complications
Developing personal strategies to address psychosocial issues and concerns
Developing personal strategies to promote health and behaviour change

Source:(83)

1.6.4 Planning diabetes education interventions

The IDF and ADA have both published evidence-based standards for the delivery of DSME that are used around the world.[3,7] While these guidelines overlap significantly, the IDF has compiled three levels of guidelines that take into account limitations in health and financial resources in many parts of the world. The 'levels of care' approach outlines recommendations for: comprehensive care, which is appropriate in highly resourced settings; recommended care, which rationalises evidence-based guidelines with cost effectiveness; and limited care, which acknowledges that some evidence-based guidelines are beyond reach in certain countries.[3]

Policy and documentation

According to the national standards of the ADA for DSME and support (2014), programmes must have a documented organisational structure, a mission statement and goals.[7] The IDF also recommends protocol-driven education under "recommended care guidelines."[3] This helps to articulate clearly the goals for the efficient and effective provision of DSME services.[7,85] Documentation of organisational structure and the process of service delivery is widely accepted as important for clear communication and delivery of quality services.[7] The standards also highlight the importance of a written DSME curriculum based on the best available evidence for interventions with criteria for evaluating outcomes that improve consistency in care and quality assurance.[3,7]

Multiple stakeholder input in diabetes self-management education

The delivery of DSME is a multi-disciplinary effort, involving at least one registered nurse, a registered dietitian, pharmacists and other professionals with certification or experience in diabetes care.[3,7,43,86] Evidence also supports the need for educators with advanced skills in diabetes management.[3,74,86] Recent literature supports the inclusion of health professionals who have not traditionally been involved in DSME, such as podiatrists, physicians, exercise physiologists, ophthalmologists and optometrists[74,87] Psychological interventions are particularly useful in situations in which adherence is low.[87] External input in programme design and delivery should be sought from relevant stakeholders.[7] This input should originate from people with diabetes, health professionals with diabetes expertise and communities at large.[7] Multiple stakeholder

participation increases 'buy in' and fosters patient education that is responsive to cultural values, is equitable and is evidence based.

Education process

Individualised DSME and support is a key recommendation of both ADA and IDF standards.[3,7] Assessment of the patient factors (e.g. medical history, cultural influences, baseline diabetes knowledge, self-management skills and behaviours, attitudes towards diabetes and its treatment and health literacy) are crucial in planning the interventions and goals of DSME.[79,80,88] These goals should be documented to allow effective monitoring and to foster communication between the multi-disciplinary team members. Ongoing DSME is critical for the maintenance of behaviour change.[6,7,85] Hence, the AADE recommends that clinic-based DSME programmes are linked to community-based DSME to ensure continuity.[74] These elements are consistent with the chronic care model (CCM) approach, which has been shown to improve service delivery for chronic conditions, including diabetes.[89,90] Finally, providers of DSME must strive continuously to improve the quality of DSME through regularly appraising the process of DSME and the outcomes and making adjustments accordingly.[7]

1.6.5 Diabetes education in Zimbabwe

According to the WHO, in 2014, 95% of the 178 member states had operational departments/units dedicated to non-communicable diseases (NCDs) within their health ministries, including Zimbabwe.[91] Despite this, there is a paucity of data and policy on DSME in sub-Saharan Africa.[11] In a positive first step, the Ministry of Health and Child Care (MOHCC) in Zimbabwe recently (2015) adopted a policy document on NCDs.[92] While this is a significant step, more still needs to be done to operationalise the prioritisation of NCDs. For example, Zimbabwe is yet to deliver a policy/strategy to promote healthy diets, physical activity, surveillance and monitoring of NCDs.[91,93] An audit of DSME in neighbouring South Africa also identified the lack of policy as a barrier to the provision of structured DSME.[11]

1.6.6 The role of the diabetes educator

The American National Certification Board for Diabetes Educators (NCBDE) defines a diabetes educator as a health care professional who "possesses comprehensive

knowledge and experience in diabetes management and prevention".[83,94] A diabetes educator supports self-management to achieve behavioural and treatment goals that optimise health outcomes.[94] In many countries, a diabetes educator is certified on completion of examinations and a minimum number of hours of clinical practice.[2] Though certification is highly desirable, it is not mandatory for health-care professionals working in diabetes care.[2,86,95] There are no known certification programmes for diabetes educators in Zimbabwe, although some nurses working in public health facilities have received continuous post-qualification education on diabetes management that is sponsored by industry.[96]

1.6.7 Barriers to implementation and access to diabetes education services

Critical shortages of finance and qualified human resources to deliver diabetes education and lack of institututional and national policies on the delivery of DSME are major challenges to the delivery of DSME.[3,74] The average national expenditure on diabetes in Zimbabwe is a meagre USD58 per patient per annum, a figure far below the global and regional average.[18] Furthermore, Zimbabwe's recently approved policy document on non-communicable diseases does not specify case management and DSME standards.[92] Most countries in sub-Saharan Africa lack adequate data and policy on the provision of DSME services.[11,10] Likewise, evidence suggests that even in places where these structures exist, the utilisation of DSME services is very low.[77,78] In the United States of America (USA,) it is estimated that only 6.8% of newly diagnosed T2DM patients participate in structured DSME within the first 12 months of diagnosis.[2,78]

At the health facility level, patients and health professionals often have limited knowledge on the necessity and the effectiveness of DSME.[2,76] A joint position statement of the ADA and the Academy of Nutrition and Dietetics stated that health professionals are not knowledgeable in regard to referrals for DSME.[2] A common misconception is that DSME is a once-off event, requiring no further follow-up interventions.[2,74] Also, education that is not sensitive to the demographic profiles and cultural beliefs of the intended population, such as age, gender, level of education, socio-economic status, ethnic and religious background, limits the effectiveness of DSME.[74,76] Another significant barrier to the access of DSME is the reimbursement

policy, given that only 10% of the Zimbabwean population has access to health insurance.[97]

1.6.8 Nutrition education in diabetes self-management education

While there is overlap between nutrition education provided as part of DSME and MNT, there are also very important distinctions. Diabetes self-management education covers a wide range of topics from self-monitoring to medication management as well as nutrition education.[86] Medical nutrition therapy is highly specific to nutrition education and can only be provided by a registered dietitian.[95] The nutrition content thereof is more comprehensive and individualised than that provided by DSME.[4, 86,95]

1.7 MEDICAL NUTRITION THERAPY

Research has consistently shown that nutrition therapy is vital for successful diabetes management.[42,43,98,99] It is, therefore, highly recommended that all people with diabetes receive nutrition education provided by a registered dietitian.43,98 Medical nutrition therapy interventions implemented by a registered dietitian have been shown to reduce HbA1c by as much as 1% to 2% (range: 0.23–2.6%), depending on the type, duration and intensity of MNT.99 The greatest benefits of MNT are seen in newly diagnosed patients, while the effectivenss of MNT diminishes with longer durations of diabetes.[99,100] Nonetheless, MNT is still more cost-effective than adding a third medication (insulin) for people with T2DM who are already on two oral agents.100 A recurring characteristic of successful MNT programmes is that they are ongoing in nature (i.e. involve multiple encounters with a dietitian from diagnosis). It is currently widely acknowledged that once-off dietary instructions do not leave a lasting impact on patient behaviour.[99,101] However, the widespread, global shortage of registered dietitians is a significant limitation to successful MNT interventions.[102] According to the Allied Health Professionals Council (AHPCZ), there are only 10 registered dietitians in Zimbabwe and the country does not dietetics programme for training registered dietitians.

1.7.1 Defining medical nutrition therapy

The Academy of Nutrition and Dietetics defines MNT as the “evidence based application of the nutrition care process, which may include one or more of the following: nutrition assessment, diagnosis, intervention, monitoring and evaluation”.[103,104] The goal of MNT

in the management of diabetes is to support healthy eating patterns with emphasis on nutrient density and portion control to attain desirable blood glucose levels, lipid profiles and overall health.[4, 43,99] Nutrition therapy further aims to prevent or at least slow down the development of complications by providing interventions that are consistent with the individual's preferences, willingness to change and health literacy.[42,43] Medical nutrition therapy focuses on practical tools for meal planning rather than on specific nutrients while maintaining the pleasure of eating by only limiting food based on scientific evidence.[43]

1.7.2 The value of weight loss

Modest weight loss (particularly for overweight/obese individuals) is a highly effective intervention for the prevention of T2DM in pre-diabetes and the onset of the early stages of T2DM.[99,105] Weight loss also improves glucose, lipid and blood pressure control with benefits seen as early as six weeks to three months post intervention.[106,107] However, trials have shown that weight loss can be extremely difficult to achieve and sustain.[43,99] For example, in the Look AHEAD trial, weight loss was achieved through out of the ordinary interventions, which included weekly dietary counselling for the first six months, liquid meal replacements and structured meal plans.[99,108] Such intensive interventions may not be practical in a non-research setting. Hence, more translational research must be done to determine how best health resources can be deployed to achieve weight loss goals in patients.

1.7.3 Nutrition guidelines

Nutrition therapy recommendations for diabetes management emphasise the importance of energy balance for appropriate weight management and the balance of carbohydrates with the available insulin.[42,43] Other major themes of MNT guidelines are carbohydrate quality (i.e. consuming adequate amounts of fibre and considering the glycaemic index/load) and the use of sucrose, non-nutritive sweeteners and alcohol. Owing to the risk of CVD in people with diabetes, the amount and type of dietary fat is also a central theme.[42,43] Contributing factors that need to be included in the content of MNT are physical activity guidelines and the monitoring of blood-glucose levels.[43]

Macronutrient combinations

Owing to the importance of carbohydrates in diabetes control, it is crucial that people living with T2DM are aware of the sources of carbohydrate and the measures to maintain consistency in the amount and timing of intake to achieve good glycaemic control.[2,42,43] The optimal amount of carbohydrates and other nutrients should be individualised in accordance with metabolic goals, patient preferences and types of medication.[2,42,43] In regard to T2DM, the best evidence-based strategy for carbohydrate management is to employ simple meal planning approaches such as healthy food choices and the plate model.[43,109] These strategies are particularly helpful for the elderly and those with low literacy levels.[109,110] As an additional strategy to achieve better glucose control, nutrition therapy guidelines recommend the use of low glycaemic index carbohydrates and the intake of dietary fibre (whole grains, fruits and vegetables) up to the daily recommended intake (DRI) levels of 25g to 30g/day.[42,43] Adequate fibre has demonstrated to reduce all cause of mortality in all populations.[2,42, 43,111]

Dietary fat and cardiovascular disease risk

Owing to the high risk of CVD in people with diabetes, it is essential that MNT interventions also address dietary fat intake.[42,43,101] Medical nutrition therapy interventions for people with diabetes and/or CVD are based on reduced fat diets and consumption of dietary fats that reduce the risk of CVD though their influence on serum lipoprotein profiles.[42] Dietary fat interventions promote reductions in trans and saturated fatty acids while increasing mono- and polyunsaturated fatty acids in the context of a low/reduced fat diet.[2,42,43] Other interventions include adoption of low sodium diets and eating patterns such as the Mediterranean diet and the Therapeutic lifestyle changes (TLC) diet, which have both shown success in patients' blood glucose and CVD risk management.[43]

1.7.4 The role of the registered dietitian

Registered dietitians (RD) are health professionals with expertise in food and nutrition. Dietitians are able to translate the science of nutrition into practical solutions for the prevention and management of disease.[104,112] Dietitians must meet minimum academic requirements that include the successful completion of didactic dietetics education and supervised practice experience. Additionally, registered dietitians must successfully

complete a registration examination and comply with national requirements for continuous professional development (CPD).[104] The role of dietitians in the prevention and management of diabetes has gained increasing importance.[42,43,107] One of the first trials to recognnise the importance of dietitians was the DCCT in which the role of dietitians expanded from initially collecting diet histories and providing nutrition education to negotiating treatment goals with patients.[107] Moreover, adherence to dietary recommendations is strongly correlated with adherence to other self-care behaviours and better glycaemic control, which highlights the importance of dietary intervention and dietitians.[113]

1.8 PHYSICAL ACTIVITY

The evidence for physical activity and glycaemia overwhelmingly shows that regular exercise has positive effects on blood glucose control, weight management, blood pressure and lipid control.[43] Patients with T2DM benefit greatly from physical activity since exercise improves insulin sensitivity, a major contributor in the development and progression of T2DM.[114] The physical activity recommendations for T2DM are to engage in moderate-intensity aerobic and resistance/strength training for at least 90 minutes to 150 minutes per week.[2, 42]

1.9 SELF-MONITORING OF BLOOD GLUCOSE

Self-monitoring of blood glucose levels (SMBG) is crucial to glucose management for people on insulin therapy.[115-117] For this group of people, SMBG is recommended at least three times a day to determine adequacy of insulin doses and to guide adjustment of insulin, carbohydrate intake and physical activity patterns.[43,117] The evidence for SMBG is not as strong for those who are not on insulin (i.e. those on oral medication or diet alone).[115] In this group, SMBG can be useful; however, the frequency is dependent on treatment goals.[117] Studies that have investigated the utility of frequent SMBG in non-insulin dependent people found that SMBG was not associated with improved adherence to other self-management behaviours.[43,115,117] However, frequent SMBG is recommended for non-insulin users who experience frequent, unexplained hypo- or hyperglycaemic events.[43]

1.10 QUALITY IMPROVEMENT OF DIABETES SELF-MANAGEMENT EDUCATION

There is a need for health institutions to evaluate the quality of services rendered to patients with chronic conditions such as diabetes. Consequently, the CCM approach was developed in the mid-1990s as a tool to restructure health resources to respond to the needs of chronic patients.[118] The CCM approach (Figure 1-4) aims to improve health system design by improving clinical documentation and monitoring as well as fostering a supportive environment beyond the sphere of health facilities for patients to participate in decision-making and thus improve outcomes.[13,91,118] The CCM is the conceptual framework for the development of the PCRS tool.

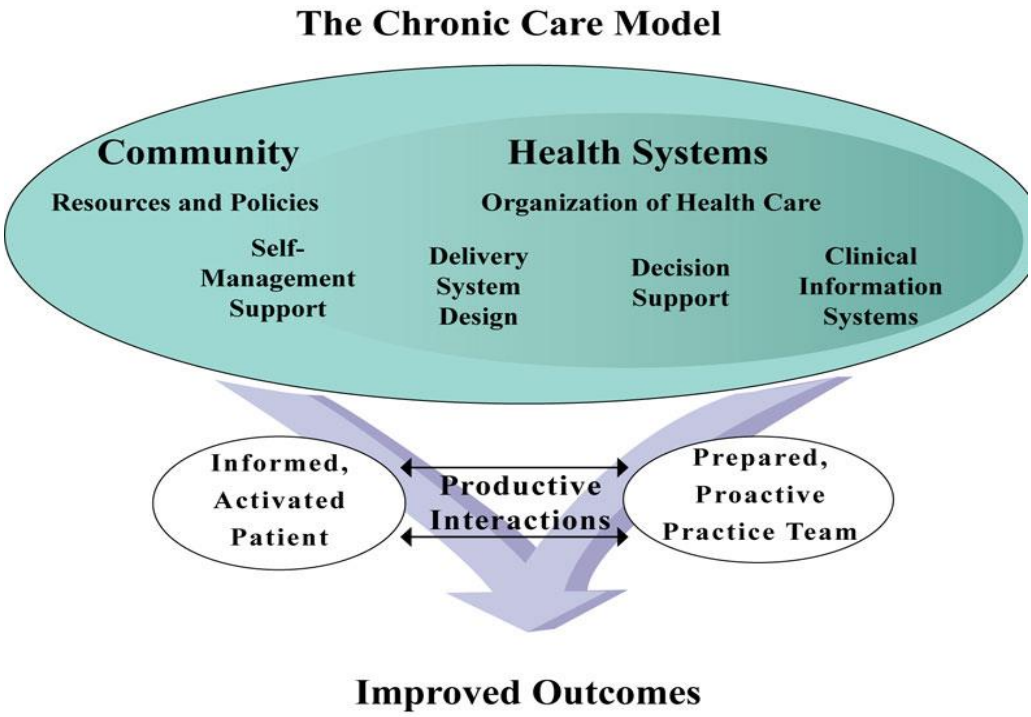


Figure 1-4 Chronic care model
Source: (118)

A systematic review of 16 studies that used the CCM approach in diabetes management showed that the CCM is effective in improving health service delivery and improving clinical outcomes in patients with diabetes.[90] Furthermore, studies have found that patients who attend clinics that employ the CCM approach achieve better glucose control compared with patients who do not.[89,90]

1.10.1 Implementation of the chronic care model in resource-limited settings

African health care systems are currently experiencing an epidemiological transition from acute to chronic diseases, and the CCM approach is already being partially implemented with documented success in the fight against HIV/AIDS.[119,120] It is, therefore, possible that certain elements that are effective in the management of HIV/AIDS (e.g. support groups and adherence counselling) can be transferred to other chronic conditions such as diabetes.[119] However, severe shortages in skilled health professionals and resources remain significant barriers to the expansion of the chronic care approach.[82,120] For example, 62% of posts reserved for doctors in the public healthcare system in Zimbabwe were vacant in 2009.[81]

1.10.2 The Primary Care Resources and Support for Chronic disease self-management tool

The PCRS and the Assessment of Chronic Illness Care (ACIC) tools were developed to assess six areas of health system changes outlined by the CCM: self-management support, delivery system design, decision support, clinical information systems, organisation of health care and community support.[121,122] The two tools are among the first to measure health system support for chronic conditions rather than the traditional patient outcomes (e.g. glycaemic control).[122,123] The PCRS tool was developed by the American Diabetes Support Initiative in collaboration with the Robert Wood Johnson Foundation in order to improve the quality of self-management support systems and service delivery in primary health care centres.[13,121] A specific goal of the PCRS tool is to serve as an objective quality improvement, self-assessment tool that informs decisions regarding self-management support and resource allocation.[121] In addition, it helps to define optimal performance for research teams by identifying gaps in services and resources through regular performance appraisal.[13] The PCRS has undergone a rigorous development process, including work-group meetings, expert consultation and three

phases of pilot testing. It has been used widely in research and clinical care settings for chronic diseases around the world.[13,121] The tool is a 16-item checklist that is completed by all members of a chronic care team and assesses the characteristics of patient support and organisational support shown in Figure 1-5.[13]

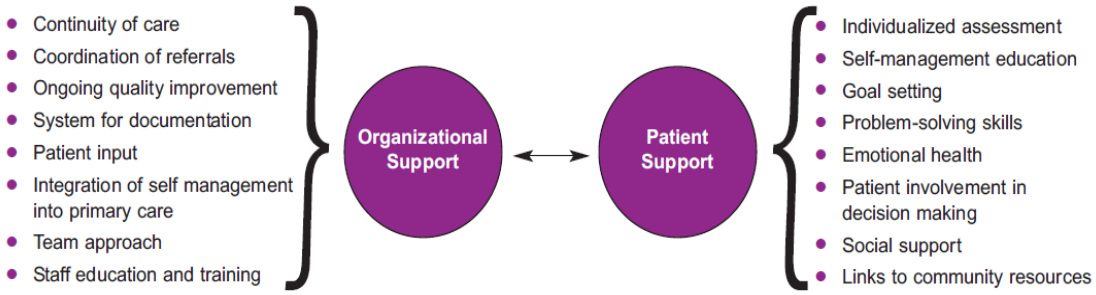


Figure 1-5 Characteristics of resources and support for self-management in primary care
Source: (121)

1.11 ASSESSING DIABETES KNOWLEDGE, ATTITUDES AND PRACTICES

Major theories on health education and behaviour such as the Health Belief Model (HBM) and the Theory of Reasoned Action (TRA) emphasise the importance of knowledge and positive attitudes in changing health behaviour.[123-125] Therefore, in order to have a positive impact on behaviour change, it is important for health education programmes to target patient knowledge and attitudes.[126]

1.11.1 Diabetes knowledge

Several studies across different populations globally have shown that diabetes-related knowledge is sub-optimal among people with diabetes.[127,128-133] Literature that has assessed nutrition knowledge reveals that people with T2DM particularly lack knowledge in the area of self-management.[128-130,132-134] A Zimbabwean cross-sectional study in 2012 reported major knowledge gaps in responses to questions related to diet, glycaemic control and insulin use.[129,135] A similar South African study also revealed inadequacies in knowledge regarding the identification and treatment of acute and chronic complications and the awareness of carbohydrate containing foods.[130] Poor knowledge in regard to carbohydrates has also been demonstrated in two Nigerian

studies.[132,133] Other areas such as the effect of exercise on blood glucose concentrations and the understanding of the fat content of foods are also poorly understood in African T2DM populations.[132,133]

1.11.2 Measuring instruments for diabetes knowledge

An estimated 30 diabetes knowledge tests have been validated across the world, with none known to be validated in an African setting.[76,132, 136,137] Moreover, there are very few tools that focus on nutrition knowledge.[134] The Diabetes Knowledge Test (DKT) is the most frequently used test, with demonstrated validity in many countries around the world.[136] Although it has not been validated in any African countries, it is frequently used by African researchers, including researchers in Zimbabwe.[128-130] The first 23-item version of the DKT was developed in 1998 by a multidisciplinary team of diabetes experts in Michigan, USA.[138] A revised version of the tool (DKT-2) has recently been developed and validated in the USA to reflect the changes in the management of diabetes since the first DKT was proposed.[136]

1.11.3 Determinants of knowledge

Patient characteristics that are associated with levels of diabetes knowledge include health and numeracy literacy, duration since diagnosis and type of medication used.[51.110,128,138] Low literacy levels are associated with poor diabetes knowledge.[110,128] It has also been observed that an increased duration of diabetes correlates with higher levels of knowledge, and patients who use insulin have better knowledge than those on oral medication. [128,130] The quality of DSME (e.g. standardisation and ongoing support) is also an imporatant determinant of diabetes knowledge in patients.[127]

1.11.4 Diabetes attitudes and practices

In an attempt to conceptualise attitudes, psychologists have defined an attitude as “a representation of summary evaluation of a psychological object(s) captured in attribute dimensions such as good/bad, harmful/beneficial, likeable/dislikeable and pleasant/unpleasant”.[139,140] Attitudes can be measured directly (e.g. through the use of scales to rate the level of agreement/disagreement with an object/statement) or indirectly through observations of behaviour and reaction changes in response to an object.[140] A direct method commonly used in health research is the Likert scale, which

was developed in 1932 with five responses (i.e. strongly agree, agree, neutral/undecided, disagree and strongly disagree).[141] Several studies have shown that the majority of people with T2DM do not achieve optimal glycaemic control despite adequate levels of diabetes knowledge.[142-144] Hence, many authors have highlighted the importance of attitudes and health beliefs in influencing behaviour change.[8,142] Behaviour change is influenced by a variety of other factors other than knowledge and attitudes, which include skills, motivation (self-efficacy) and social support. [145,146]

1.11.5 Measuring instruments for diabetes attitudes and practices

There are a variety of tools developed to assess self-management attitudes, which include the Diabetes Care Profile (DCP),[8] Diabetes Integration Scale-19 (ATT19)[9] and the Diabetes Attitude Scale (DAS).[9] All three tools use Likert-type responses to rate a participant's level of agreement/disagreement to each item.[8-10] The Summary of Diabetes Self-Care Activities (SDSCA) questionnaire was developed to determine the frequency of seven self-management practices in the previous seven days.[147] The SDSCA measures the frequency for general diet, specific diet, medication taking, exercise, smoking and foot care practices.[147] The results of seven studies that used the SDSCA showed that the most frequently practised self-care behaviours were medication taking and SMBG.[147] By contrast, the largest international study conducted to identify diabetes attitudes, wishes and self-care practices (the DAWN study) reported that one-third of patients 'get tired' of adhering to their medication regimen, and 16.6% of people taking oral medication felt that their regimens were "too complicated and unnecessary."[145-146] Self-care behaviours regarding diet and physical activity are reported to be the least frequently practised in patients with T2DM.[133,142,144,148] The DAWN study found that self-reported adherence to dietary recommendations was as low as 16.4% in T2DM patients.[145]

1.12 DIABETES PRACTICES IN AFRICA

It has been documented that people of African descent experience worse diabetes outcomes compared with other ethnic groups.[149] Factors that have been identified to explain this relate to cultural values and practices. Mistrust of Western medicine and a preference for traditional/herbal medications have been reported in African populations.[135,149] In addition, African populations have been shown to have a more

external locus of control in regard to health and illness than other ethnicities.[149] Two Zimbabwean studies have demonstrated that many patients believe that diabetes is caused by supernatural forces as opposed to biomedical explanations.[135,150] This has a direct impact on the self-care behaviours adopted to manage diabetes. Prayers, holy water and natural remedies are frequently used by people with T2DM in Zimbabwe.[150] Economic factors such as the cost of medication, recommended foods and transport for clinic reviews have also been cited as significant barriers to adherence to self-care behaviours.[135,150,151]

1.13 STATEMENT OF RESEARCH QUESTION AND MOTIVATION FOR STUDY

Diabetes is a chronic and progressive disease that requires people to make daily self-management decisions.[2,3,43] The rising prevalence of T2DM in Zimbabwe highlights the need for effective strategies to reduce the rates of costly complications in a health system that is already overburdened and under-resourced.[14,17,20,59,81] Several landmark studies have consistently shown that every point decline in HbA1c correlates with significant reductions in complications.[1,37-41,66] Effective DSME has been shown to reduce HbA1c by at least 1%, while MNT provided by a registered dietitian may reduce HbA1c by up to 2%.[2,43] Moreover, successful DSME services are policy driven, well documented, implemented by multiple stake-holders (including an inter-disciplinary health care team), individualised to the needs of the client and involve several client/health provider encounters.[11,12] The reality of the situation in many settings is a lack of resources to support education, a lack of standards for the provision of education, an education system that is not sensitive to the demographic environment and a lack of locally generated evidence to motivate quality improvement.[3,11,12,74] Indeed, this is the case in Zimbabwe where a significant gap in measuring the outcomes and processes of DSME interventions exists. Therefore, the current study aims to address this gap.

Assessing knowledge is an important step in identifying the diabetes education needs of patients. At the same time, both knowledge and positive attitudes towards diabetes and its treatment are pre-requisites to behaviour change.[9,140] It is, therefore, appropriate to assess all three outcomes (knowledge, attitudes and practices) of DSME with a focus on nutrition. It is hypothesised that patients attending facilities that offer DSME services

will have better knowledge, attitudes and practices than patients who attend facilities in which no known interventions occur. In addition, resources of the health care team to provide DSME have been shown to be crucial in improving quality and hence, this was also assessed in the current study.[13]

CHAPTER TWO

METHODOLOGY

INTRODUCTION

This study used a cross sectional survey design with an analytical component to assess knowledge, attitudes and practices (KAP) in adults with T2DM attending public health care facilities in Harare, Zimbabwe. The purpose of the design was to compare the differences in KAP of two groups based on their hypothesised exposure to DSME. This study also assessed the levels of resources available to support DSME through a cross sectional survey for health professionals. This chapter outlines the methods employed to conduct the study and the development of the patient KAP questionnaire.

2.1 AIM

The aim of this study was to assess the extent of DSME with a specific focus on MNT and lifestyle interventions in improving the knowledge, attitudes and practices of adult T2DM patients attending public health care facilities in Harare, Zimbabwe.

2.2 RESEARCH QUESTION

To what extent do DSME interventions (with a specific focus on MNT and lifestyle interventions) improve nutrition knowledge, attitudes and practices of the adult (18+ years) T2DM patients in public health care facilities in Harare, Zimbabwe as compared to limited/no DSME interventions?

2.2.1 Null hypotheses

1. There is no significant difference in the knowledge levels, attitudes and practices of people who have received DSME (with specific focus on MNT and lifestyle interventions) as opposed to those who have not.

2. There is no significant difference in the level of support and the extent of primary care resources between facilities with existing DSME programmes and facilities with limited or no DSME programmes.

2.3 OBJECTIVES

2.3.1 The diabetes patient

1. To determine whether patients receive DSME with a focus on nutrition at public health care facilities.
2. To assess the management of nutrition focused DSME through knowledge, attitudes and practices.
3. To compare the nutrition focused self-management knowledge, attitudes and practices of patients who had received DSME to those who did not receive DSME.

2.3.2 The health professional/facility

1. To determine whether DSME programmes (with a focus on MNT) were in place at public health care facilities sampled.
2. To assess the level of primary care resources and support for DSME using the PCRS assessment tool.
3. To compare the primary care resources and support for DSME in facilities with established programmes to facilities with no existing programmes.

2.4 STUDY PLAN

2.4.1 Study type

The design of the study was a descriptive analytical cross sectional study.

2.4.2 Study population

The study population was defined as adults with T2DM who attended public health care facilities for the management of diabetes and, all health professionals who worked in diabetes management at public clinics.

2.4.3 Sampling strategy

Sample size calculation

Power analyses calculations were performed using STATISTICA Version 11©,[152] to determine the number of participants that were needed to detect a small to medium effect size of 0.4 between two groups perceived to differ inregard to DSME received (i.e.

central hospital clinics and city health clinics). Hence, the minimum number of participants required to achieve a power goal of 90% at the 5% significance level was 140 (67 participants per group).This power goal achieved a 90% chance of avoiding a Type II error.[153] The final sample size was 156 (77 participant per group), which exceeded the initial calculation by 16 participants, and therefore increased the power of the study (Figure 2-1). All health professionals that managed diabetes patients at the sampled clinics, present on the day (s) of data collection and, who provided informed consent were included in the study.

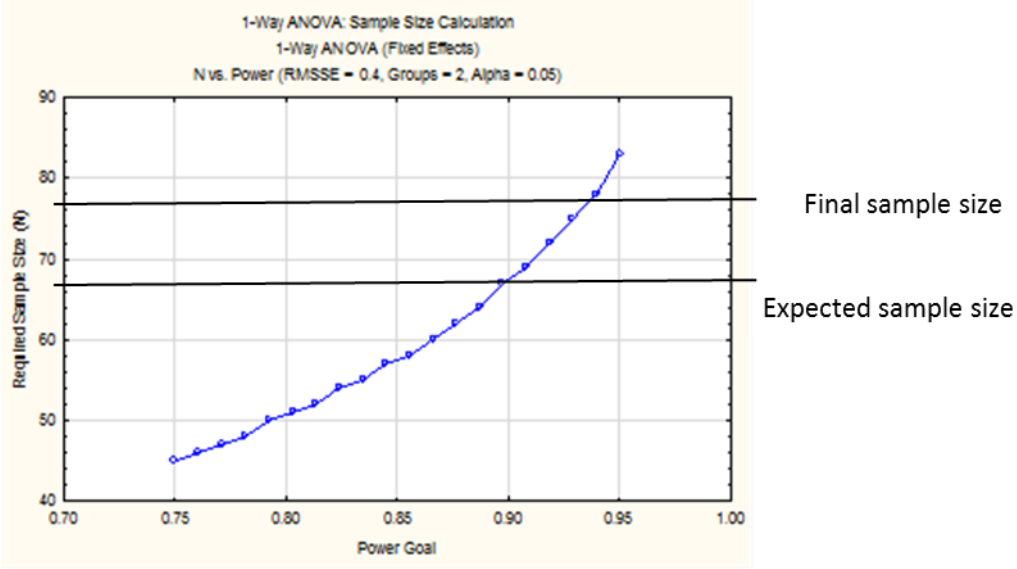


Figure 2-1: One- way ANOVA sample size calculation screenshot from Statistica©

2.4.3.1 Selection of health facilities

Public health care facilities that offer diabetes services in Harare are stratified into two groups based on their management structures. There are two central hospital out-patient department clinics (Harare and Parirenyatwa Hospitals), managed by the Ministry of Health and Child Care (MOHHC) and 31 primary care clinics which are under the city of Harare, department of health services. The geographical location of health districts and clinics are shown in Figure 2-2.

City of Harare facilities are stratified into nine districts, with varying numbers of clinics within each district (Figure 2-2). Each district has at least one poly-clinic, where specialist, curative services are offered beyond the services of standard clinics.[22] Six of the nine health districts were selected for inclusion as follows: four districts with highest

annual attendance by diabetes patients (south western, southern, west south west and north western) and two districts with lowest annual attendance (northern and eastern).

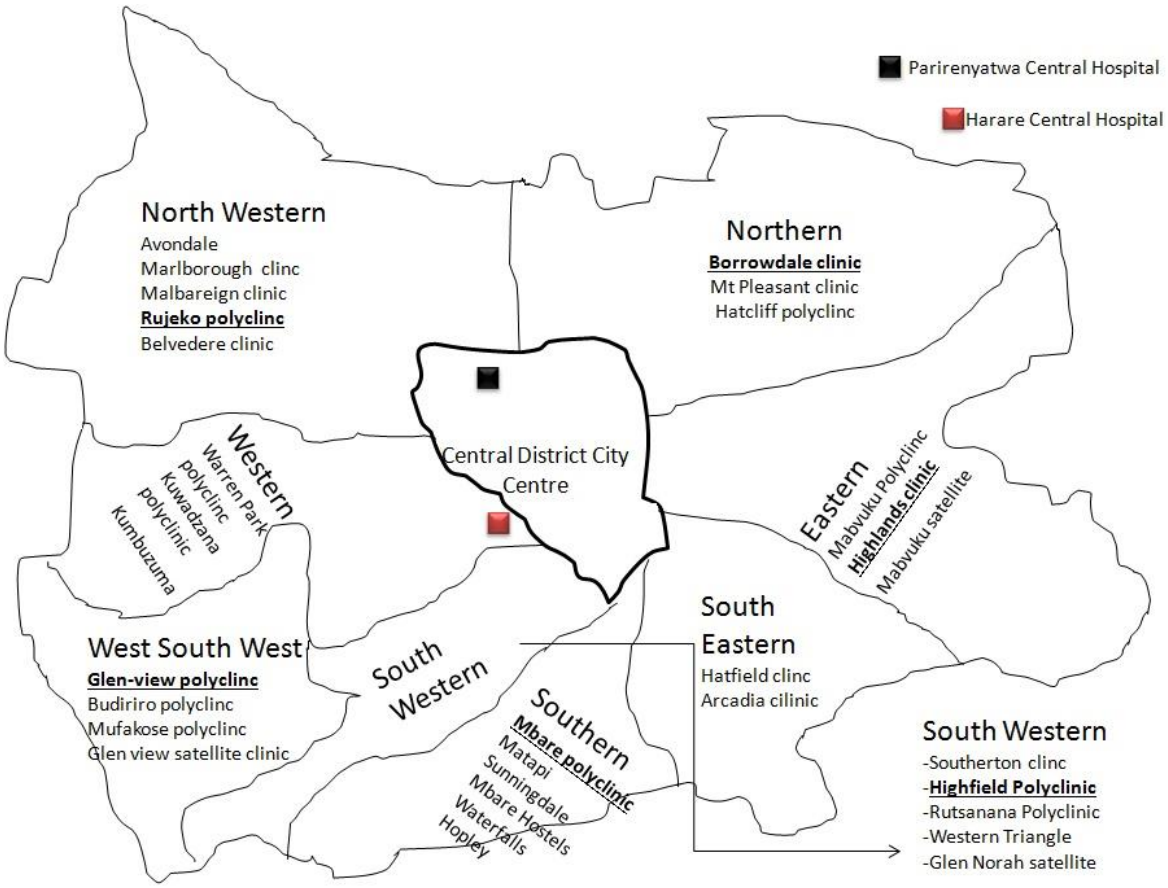


Figure 2-2: Map of health districts in Harare andclinics providing services for the management of diabetes
Source: (22)
*Population frame; clinics selected for inclusion are underlined and in bold

City health clinic selection

The poly-clinics of the four highest attended districts (south western, southern, west south west and north western) were selected. In cases where there was more than one poly-clinic in a district, random selection (using computer generated random numbers) was employed. In the two least attended districts, clinics were also selected using computer generated random numbers. The poly-clinics in these two districts were

excluded from selection. Figure 2-3 is a graphical representation of sampling strategy, describing selection of health disticts, clinics and individuals at clinics.

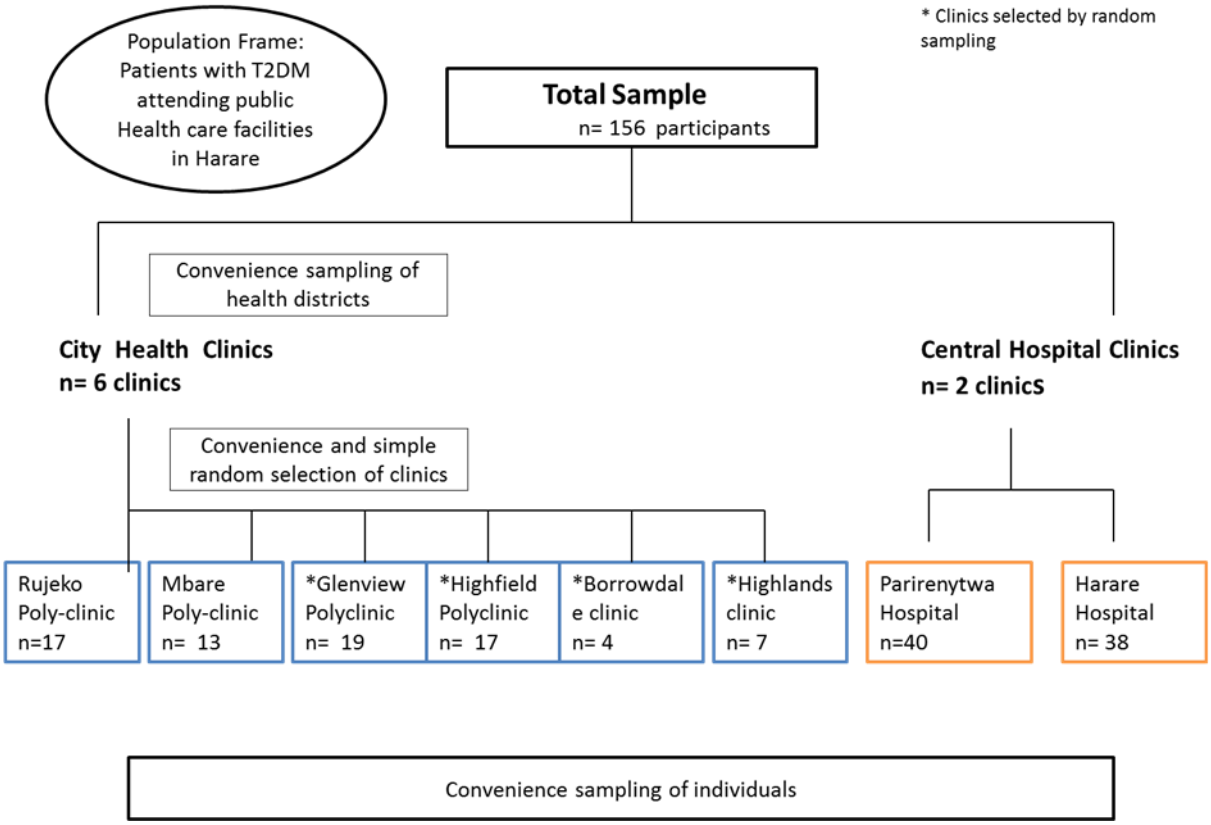


Figure 2-3: Sampling strategy for clinic selections with final sample sizes per clinic

*Clinics selected for inclusion in study

Participant selection

In the central hospital outpatient clinics, patients that met the inclusion criteria and gave informed consent were recruited during routine clinic visits. Participants that attended city health clinics were invited to participate, outside of their review days. This was done because there are no dedicated days for diabetes management at city health clinics, which made it difficult to predict when patients were likely to attend in sizeable numbers. The researcher compiled a list of names and addresses of patients that had been managed for diabetes at the selected clinics in the previous six months from diabetes registers. The local health promoters, who were familiar with the geographic areas, were asked to distribute letters of invitation to potential participants, requesting them to come to their local clinic on a given date to take part in the study. These letters (Appendix 16) explained the nature of the study, informed consent elements such as

voluntary participation and withdrawal, risks and discomforts and benefits/compensation. Participants who were invited to participate (i.e. not surveyed during their routine clinic visit) were compensated for their transport costs.

Selection of health professionals

All health professionals at sampled clinics who worked in diabetes care and were on duty on the day of data collection were invited to participate in this study. Questionnaires were either completed on the day of data collection or at the convenience of the health professionals.

2.4.4 T2DM patient inclusion/exclusion criteria

Inclusion criteria

- Public health clinics offering outpatient diabetes services in Harare
- Adults aged 18+ years, diagnosed with T2DM, attending a selected clinic
- All patients able to provide informed consent

Exclusion criteria

- All patients diagnosed with T1DM, gestational diabetes or any other type of diabetes
- All patients under 18 years old

2.4.5 Health professional inclusion criteria

- Health professionals working in diabetes care at sampled clinics
- Health professionals on duty at the time of data collection

2.5 METHODS OF DATA COLLECTION

A hard-copy KAP questionnaire was administered to T2DM participants by a research team member, and the PCRS tool was self-administered by health professionals. On average, it took between 25-30 minutes to obtain informed consent and administer the KAP questionnaire. The health professional questionnaire and consenting process took 20-25 minutes to complete. Data was collected between March 2015 and August 2015 by the principal investigator and four research assistants. The research assistants were

student interns in their third year of a BSc in Nutrition degree at the University of Zimbabwe.

2.5.1 T2DM patient knowledge, attitudes and practices questionnaire

The KAP questionnaire (Appendix 1) was developed by the researcher, through a process of reviewing relevant literature, seeking consensus amongst local experts, and pretesting on the intended population. The development of the questionnaire is further described in the questionnaire development section. Each participant had the choice to have the questions read out to them in English or Shona. All question responses were structured (multiple choice answers) with the exception of the comments section, which was free text. Participant could only select one answer to each question. The final version of the questionnaire included 47 items that were divided into demographic (11 items), knowledge (11 items), attitudes (13 items) and practices (12 items) sections.

Demographic component

Demographic information collected included gender, age and education level. Data on the duration of diabetes and type of medication used was also collected. The demographic variables: clinic group, consultation with a dietitian and diabetes educator were the primary stratifying factors to differentiate between groups that received nutrition focusd DSME and those that did not. The effect of secondary variables (e.g. age, duration of diabetes, education level, and primary source of diet information) on KAP werealso investigated.

Knowledge component

There were 11 knowledge questions that assessed nutrition (five items), general self-management knowledge (four items) and insulin use knowledge (two items). Within the nutrition theme, carbohydrate knowledge (three items) was measured. The general sef management thememeasured knowledge on complications (two items) and prevention of diabetes e (one item).Each question had one correct answer. A score of one was assigned to each correct answer and zero for incorrect answers. Individual questions that were incorrectly answered by more than 40% of the sample were considered knowledge gaps.

Attitudes component

Lickert type response scales were used to assess attitudes. Responses were measured on a five point lickert scale, which rated attitudes towards an attribute from strongly disagree to strongly agree. A numerical value was assigned to each response choice on the five point lickert scale depending on how the question was phrased. The highest possible score for each characteristic was five, indicating a highly positive, desirable attitude trait. Conversely, the lowest possible score was one, which indicated negative, undesirable attitudes. Table 2-1 shows the numerical value assigned to responses depending on the way that the question was phrased.

Table 2-1: Example of scoring system of attitude questions

3.1 I think it is important for me to keep my blood sugar in good control 1. Strongly Disagree 2.Disagree 3. Neutral 4. Agree 5. Strongly Agree	3.2 I do not think that being overweight can make it harder for me to control my blood sugars 1. Strongly Agree 2. Agree 3. Neutral 4. Disagree 5. Strongly Disagree

Practices component

Frequency scales were employed in the practices section to measure self-care behaviours. Diet and physical activity behaviour questions were measured on seven day frequency scales. The frequency of self-monitoring of blood glucose, medication adherence and use of traditional medicines were assessed in categories, ranging from daily performance of behaviour to never. In the diet and physical activity frequency scales, self reported adherence for less than than three days (out of the previous seven days) was considered poor adherence, four to six days of adherence was considered good and seven days of adherence, considered excellent.

2.5.2 Health professional questionnaire

The PCRS tool consists of 16 items that measure organisational and patient support for self-management. Each characteristic could be rated a score from one to ten. The numerical scores corresponded to four levels of performace from highest (A) to lowest (D). Performace category D indicated non-existent activity, and category C,

implementation that was sporadic, inconsistent and passive patient provider interactions. Category B corresponded to good organisation and consistency in the implementation of services, and the highst level (A) assumes system wide intergration of self-management support characteristic.[121] The PCRS tool has been validated and found applicable for use in a variety of settings.[121 122] Although the PCRS tool has never been used in Zimbabwe, it is based on the CCM approach, which is the gold standard for the management of chronic conditions.[121,122]

2.6 QUALITY CONTROL

2.6.1 Pre-testing the survey

A pre-test was performed to determine face validity of the nutrition focused DSME measuring instrument in the intended population. The practical application of the survey tools and logistical arrangements with regard to obtaining the target sample at each clinic, were also assessed. Adaptations were made to the patient questionaire based on the results of the pre-test survey and the item analysis performed. These changes are described in detail in the questionnaire development section (section 2.11). The data obtained from the pre-test was therefore not added to the main study owing to the changes that were made to the tool after the pre-test. The health professionals in the pre-test were included in the final sample, as no changes were made to the PCRS tool after the pre-test. Results of the pre-test are shown in Appendix 17.

2.6.2 Training and standardisation of field workers

The field workers were trained on the administration of the questionnaire prior to the pre-testing phase. The four field workers attended a two hour training course presented by the researcher. The training included operational procedures on administering the questionnaires, in addition to aspects of human participant's protection and ethical data collection. After the training session, the fieldworkers were asked to practice administering the measuring tool to each other, in both languages. The pre-test also served as further training and standardisation of the field workers.

2.6.3 Data collection

Quality control checks were built into the data collection phase of this study by electing one field-worker to concentrate on checking the completeness of forms while data

collection was concurrently taking place. This allowed for most missing values and inconsistent inputs to be detected and rectified before the participants had left the clinic. The quality control field worker was also responsible for ensuring that the informed consent forms were complete, and a copy handed to each participant. At the end of day, the quality control fieldworker completed a pre-screening form (Appendix 8), and a facility checklist (Appendix 9) with prompts to check the completeness of consent forms and questionnaires. De-briefing meetings were held at the end of the day to discuss specific problems in data collection.

2.7 VALIDITY AND RELIABILITY OF DATA

2.7.1 Validity

Validity of a study refers to the conceptual and scientific soundness of a research study and whether the research instuments measure what is intended to be measured.[154, 155] Internal validity was controlled through random sampling where possible, while the inclusion and exclusion criteria were strictly adhered to. External validity was achieved by including a representative sample of six out of nine districts and the two biggest outpatient diabetes clinics in Harare. The measures taken to improve validity of the measuring instruments are described in the questionnaire development section (2.11). The pre-test also served as a face validity test, ensuring that all items in the questionnaire were appropriate and understood by the majority of the target population. Internal content validity was sought through expert consensus during the questionnaire development phase.

2.7.2 Reliability

Reliability was achieved by standardisation of the field workers on procedures to complete the patient questionnaire and PCRS tool for health professionals. Observer reliability was controlled through supervision of the field workers by the researcher and quality control checks of the data. The items on the questionnaire were adapted from validated existing questionnaires which already had test-retest reliability and internal consistency checks.

2.8 DATA MANAGEMENT

2.8.1 Data capturing

The patient KAP survey was captured on a database designed using Epi Info version 7©. The database was designed by the principal researcher with built in quality control mechanisms such as ranges of acceptable answers for fields. The data was double captured by the researcher in order to minimize errors in data entry. The Epi-Info database was then converted into a Microsoft (MS) Excel spreadsheet©. The PCRS tool data was captured directly on Microsoft (MS) Excel©.

2.8.2 Data analysis

Data analysis was performed using Statistica Version 11©, statistical analysis package.[152]

Descriptive analysis

Distributions of variables are presented with histograms and frequency tables. Data in the demographic section is displayed as frequencies and percentages for ordinal data and means with standard deviations for nominal data. Mean scores (also expressed as percentages), standard deviations and 95% confidence intervals (to measure uncertainty) were calculated for each knowledge theme, subscale and the total knowledge scores.

Indiviudal attitude items were analysed as lickert type response (i.e ordinal data), with frequency distributions of response patterns. Lickert type data was coded numerically such that in all cases responses that scored 4-5 indicated positive attitudes, a score of 3 indicated neutral attitudes and, a score of 1-2 indicated negative attitudes. Two lickert scales composed of a series of lickert type items were created to represent nutrition self-management and general self-management themes. Lickert scale data was summarised using means and standard deviations. The frequency of dietary and physical activity adherence parameters were measured on a seven day scale and frequency distribution of self-reported days of adherence was displayed as follow: 0-3 days corresponds to poor adherence; 4-6 days to good adherence, and 7 days corresponds to excellent adherence. The mean days of adherence, with standard

deviations for each self-care behaviour, were also calculated and compared between groups. Other self-care behaviours were reported as frequencies.

Inferential analysis

Hypothesis and correlation testing were used to assess the relationships between independent variables (knowledge, attitudes and practices) and dependant variables. Shapiro-Wilk tests perfomed indicated the need to use non parametric tests, which were also apporpiate given the ordinal nature of the data. Two tailed tests were used to determine statistical significance between groups.[156] In keeping with convention, a p-value of < 0.05 represented statistical significance in hypothesis testing. Mann Whitney or Kruskall Wallis tests were performed to determine the relationships between ordinal responses and nominal input variables. Mann Whitney tests were performed for comparing paired observations, such as clinic groups. The Kruskall Wallis test was used in cases where more than two groups were compared.[156] Confidence intervals for the knowledge, attitudes scores, and mean days of adherence to diet and physical activity were calculated to estimate the most likely range of the unkown population.

Correlation testing

The Spearman's rank correlation coefficient was used to determine the measure of association between two variables, for example, the measure of association between age (in years) and mean diabetes knowledge, attitudes and practices.

Qualitative analysis

Free text responses to the comments section were analysed by identifying common themes emerging from the data and counting frequency occurence. The two main themes were categorised broadly into: comments on education received and challenges to adherence. Within these two broad themes, sub-themes were identified e.g time and money constraints in the challenges to adherence theme, and need for more education in the comments on educaton theme.

2.9 DELIMITATIONS

An assumption made in this study was that participants who had reported consulting with a registered dietitian or diabetes educator were likely to have received DSME with a focus on nutrition therapy and lifestyle interventions. Both registered dietitians and

diabetes educators work exclusively in the central hospital clinics. Hence, clinic group was the primary stratifying for hypothesised exposure to DSME. T2DM adults were chosen as the population of interest owing to a higher prevalence of diabetes in adults and, also a higher burden of T2DM compared to other types of diabetes. The variables of interest (knowledge, attitudes, practices and quality of DSME) were investigated owing to strong correlation between all four variables and glycaemic control. In addition, it is argued that all four variables are the most informative on the current state of diabetes education and are both process and outcome measures. No sample size calculations were performed for the health professional component (i.e. the PCRS tool) as there was no information on the expected numbers of health professionals at sampled clinics.

2.10 ETHICAL AND LEGAL ASPECTS

Ethics approval was obtained from the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Stellenbosch University (HREC Reference # S14/03/063). Ethical approval was also sought from the Medical Research Council of Zimbabwe (MRCZ), which is the over-arching ethics governing body for research. The city of Harare department of health services, Harare and Parirenyatwa hospitals have their own separate institutional review boards (IRB's), where ethical approval was also sought. See Appendixes 11-15 for all ethics approval letters.

The researcher trained all fieldworkers and community health workers who assisted in recruitment and data collection on human subject's protection. Participants were not forced or coerced into participation in the study. Informed consent was always sought and the participants were able to exercise their autonomy to refuse to take part in the study or withdraw. The study was carried out in accordance with the Declaration of Helsinki, the International Council of Human Rights and the MRCZ guidelines. The participants from the city health clinics who were invited to participate in the study were compensated USD 2 per participant for travel expenses. There was no further benefit in taking part in this study. An identification number was assigned to each participant to ensure anonymity and data is kept in a secure location.

2.11 DEVELOPMENT OF PATIENT KNOWLEDGE, ATTITUDES AND PRACTICES QUESTIONNAIRE

2.11.1 Preparation of scope and structure of questionnaire

A review of the literature on knowledge, attitudes and practices with regard to nutritional management and general self-management of diabetes was conducted to define the scope of the survey tool. The researcher aimed to ascertain basic nutrition focused knowledge, attitudes and practices needed for successful management of T2DM. Literature was largely obtained from position papers, journal articles and other publications from sources such as the Academy of Nutrition and Dietetics,[2,42] American Diabetes Association (ADA),[6,7,43] the International Diabetes Federation (IDF)[3,5] and the American Association of Diabetes Educators (AADE).[83] The Society for Endocrinology, Metabolism and Diabetes of South Africa (SEMDSA) 2012 guidelines are the closest guidelines available that are applicable to the Zimbabwean setting.[157] Taking into consideration all the relevant literature, a conceptual framework (Figure 2-4) was developed by the researcher to reflect nutrition focused DSME constructs.

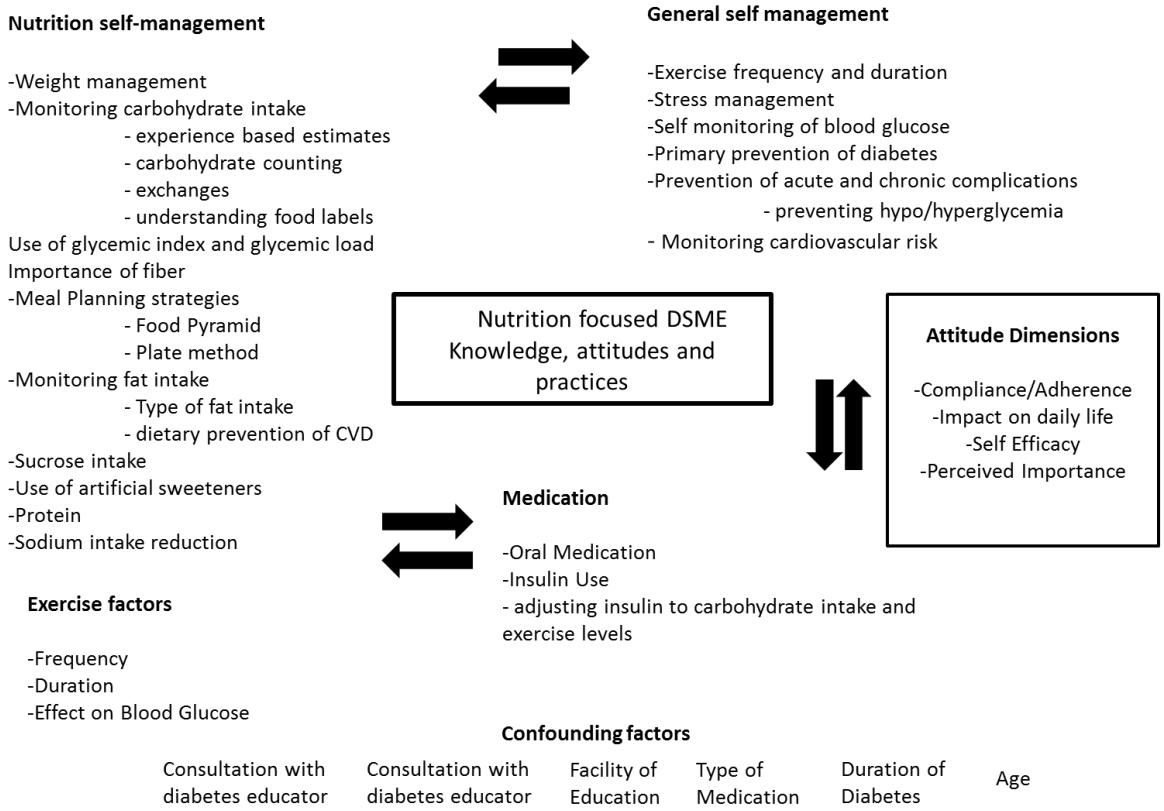


Figure 2-4: Conceptual framework on knowledge, attitudes and practices dimensions in nutrition focused DSME Source: (8)

Four registered dietitians and one diabetes educator were asked to provide their expert knowledge on DSME and nutrition education in the local context, in order to streamline the conceptual framework to locally applicable concepts. Three of the registered dietitians work in government institutions (one at Harare Hospital and two at Parirenyatwa Hospital). The other dietitian works in private practice and the diabetes educator at the Zimbabwe Diabetic Association (ZDA). The expert panel are directly responsible for DSME at their respective institutions and for developing local education material. Local education material was also reviewed to ascertain the key knowledge areas that were emphasised in nutrition and general self-management for T2DM. There was consensus amongst the experts that some of the topics/subscales identified from the literature (Figure 2-4) were not appropriate and too complex to assess in the local context, especially considering that many patients do not come for follow-up

education.In view of this, the following knowledge component subscales were eliminated: reading food labels, use of sweeteners, alcohol, sucrose, reducing sodium, glycaemic index/load, and carbohydrate counting. The expert panel did not make significant changes to the attitudes and practices component, with the exception of adding assessment of use of traditional/herbal medicines. The results of this process was a clear definition of the scope of the questionnaire through identifying subscales for knowledge, attitudes and practices that are applicable to the local context (Figure 2-5).

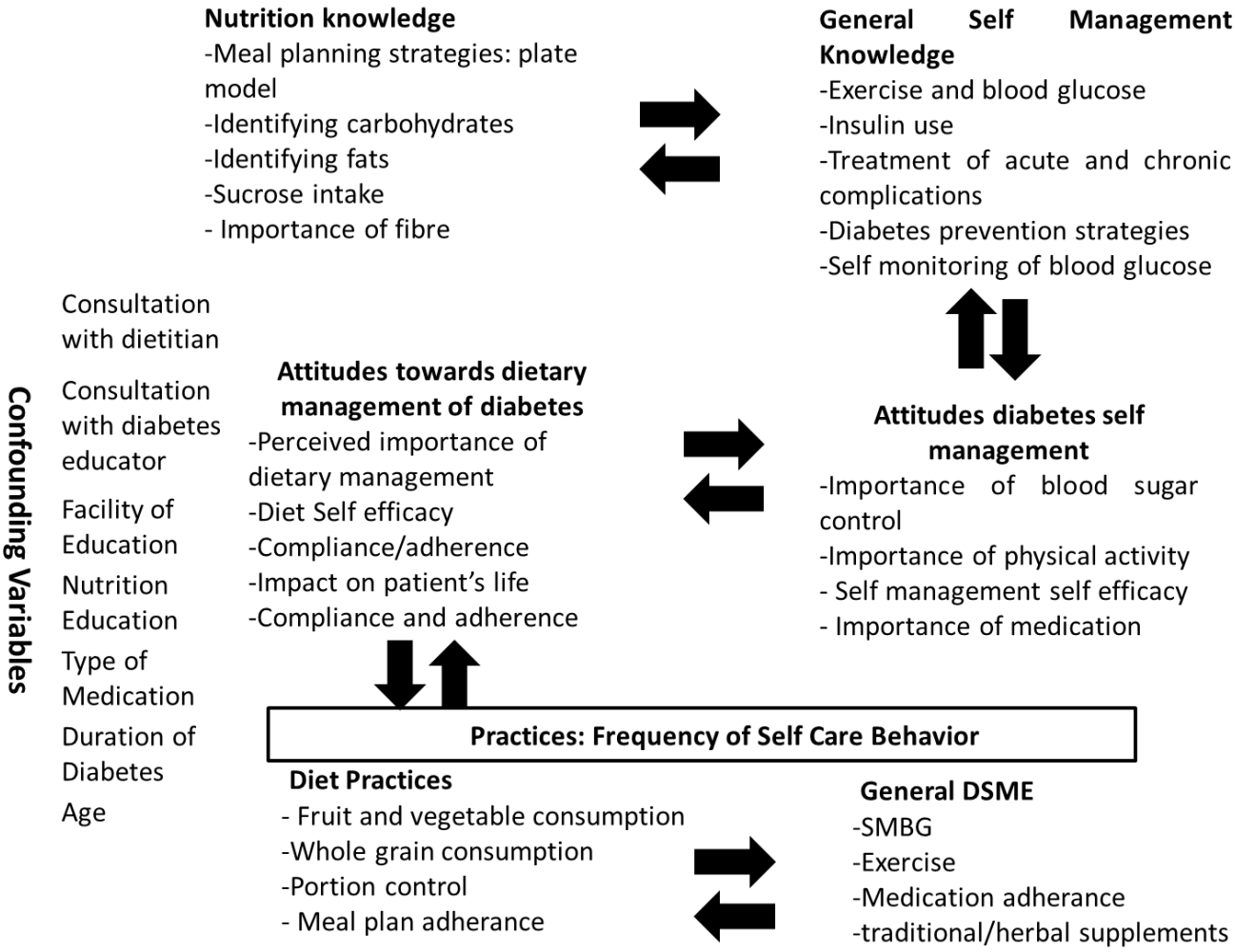


Figure 2-5: Final expert panel approved knowledge, attitudes and practices subscales

2.11.2 Development of questionnaire items

Sixty two (62) items were generated from six existing, validated questionnaires, in line with the constructs identified in Figure 2-5 in the first phase of item selection.[8,10,147,158-160] The first draft of the questionnaire (62 items) was reviewed by the local expert panel. Their recommendations were implemented in the second draft (53 items). The second draft was subsequently translated into the local language (Shona).

Knowledge

Items in the knowledge component were obtained from three diabetes knowledge questionnaires: the Diabetes Knowledge Test (DKT),[138] the Diabetes Knowledge Questionnaire (DKQ)[160] and the Orang Asli Diabetes Knowledge Questionnaire (OA-

DKQ).[159] All three have undergone reliability and validity tests.[138, 159, 160] The DKT is the most widely used diabetes knowledge test, with documented validity in a variety of settings.[138, 161] It has also been adapted and used in African settings, including in Zimbabwe.[52 128,129,130] Fifteen items from the DKT were initially included in the first phase of item selection. The DKQ was developed and validated in an Australian population, and found to be reliable (Cronbach alpha= 0.73).[160] Sixteen items (10 knowledge items, six demographic items) were included in the initial pool from the DKQ. The OA-DKQ was used primarily owing to its inclusion of items relating to the use of alternative medicine, a construct identified by local experts as relevant. The OA-DKQ was validated in an indigenous population in Malaysia and also found to be highly reliable, with an internal consistency 0.806 and 0.759 in a control group.[159] Three knowledge items were selected for inclusion from the OA-DKQ.

Attitudes and practices

Items relating to attitudes were obtained from the Diabetes Care Profile (DCP)[8] and the Diabetes Attitude Scale (DAS).[10] Both instruments have undergone validity and reliability testing.[8,10,158] In addition, the two instruments are still used in contemporary literature, despite being developed almost two decades ago.[162,163] Fourteen (14) items in the initial pool originated from the DCP and five from the DAS. The DCP was also used in item generation for the practices component (nine items were included). An additional five practice questions were adopted from the Summary of Diabetes Self Care Activities (SDSCA) questionnaire.[147]

Expert consultation on initial item pool

The process of reviewing the literature for appropriate items for inclusion was followed by expert consultation on the appropriateness of the items selected based on their expertise in the subject and of the local context. The experts were asked to rate the importance of items in relation to the study objectives and the constructs/subscales identified in Figure 2-5. The experts also reviewed the initial item pool with regard to content/face validity, sequence of questions and organisation. The result of this was a second draft of the questionnaire (53 items).

2.11.3 Validity

Content validity refers to the extent to which the instrument accounts for all the elements of the variable/construct being investigated.[154,164] The expert panel debated the inclusion of items based on constructs identified to be representative of nutrition focused DSME in Zimbabwe (Figure 2-5). Face validity refers to the extent to which the questionnaire makes sense to the respondent or those knowledgeable on the subject matter.[154, 164] Once again the expertise of five diabetes education experts was solicited. Face validity was also established in the pre-test stage. The panel of experts were asked to categorise each question based on the criteria in Table 2-2, adapted from Food and Agriculutral Organisation (FAO) guidelines for assessing nutrition-related KAP manual.[165]

Table 2-2 Categories used by the panel of experts to rate items for inclusion into second draft

Category 1	Core/essential questions. These were defined as questions that were specific to study objectives and consistent with the dimension/subscale identified by experts.
Category 2	Non-essential questions. These questions may relate to the survey objectives; however that might not be consistent with subscales identified or deemed not appropriate forthe local audience.

Source: (165)

The panel also reviewed the language used in questions and responses. Where necessary, phrases and responses were changed to be more locally appropriate, e.g. the word carbohydrate was replaced with starch (more recognised locally). In the case of food items, local dishes/foods were incorporated; e.g. sadza (ground mealies) is more recognised than pasta as a carbohydrate option. Consideration had to be given to the planned translation of the questionnaire into Shona (local language). Hence, translation was integrated from survey design stage.[166]

Translation into Shona

The questionnaire was translated from English to Shona by language experts at the University of Zimbabwe-department of African languages. In a collaborative process the researcher, panel of diabetes experts and language experts sought to achieve semantic, cultural, and conceptual equivalence in the Shona translation. The translated survey was reviewed by the bilingual expert panel. This process revealed the need for a standardised list of terms and descriptions in Shona and English. For example the word 'dietitian' is not always well understood, however a description of the role of dietitian is

better understood, especially for the Shona questionnaire. Table 2-3 is a section of the list of terms and descriptions developed in collaboration with language and diabetes content experts.

Table 2-3: Extract from the list of terms and descriptions that facilitated translation from English to Shona

English	Shona
Diabetes	Chiwere che shuga
Dietitian **A health care professional with a qualification in nutrition, who is able to advice you in detail about how to eat in order to control your blood sugar.**	Mushandi we utano anoita basa rakanangana rekudzidzisa pamusoro pechikafu kunovaka muviri (dietitiian)
Overweight	Kusimbisa
Physical activity/exersize	Maeskisesaiizi

2.11.4 Pretesting the survey

A pre-test study was conducted in February 2015 at Mufakose poly-clinic(a city health clinic not included in the final sample). The questionnaire was tested on 11 individuals with T2DM. The questionnaire administration was measured against criteria set by the FAO on the development of KAP questionnaires (Table 2-4).[165] Respondent burden referred to the length of time taken to complete the survey, the respondents reactions to questions e.g. refusal to answer questions, difficulty answering questions, signs of loss of concentration, and impatience. The ease of administration related to the clarity of wording, and general layout and sequencing of questions.

According to a methodology for item analysis developed by Priest et al, questions that illicit high (more than 80%) or low (less than 20%) endorsement of a particular response should be considered for removal in the final questionnaire owing to redundancy.[164,167] The researcher used this as a guideline, however in some instances items that showed high or low endorsement of a response were retained. Other items that were discarded lacked clarity and were often misinterpreted by the respondents or in some cases not answered at all.

An analysis of the response patterns of the pre-test showed that respondents were inclined to strongly agree with statements. Hence, the final version of the questionnaire included a mix of both positive and negative statements, thereby reducing extreme

response and acquiescent bias.[168] Questions that were poorly understood or not important to addressing the study objectves were eliminated (Appendix 17).

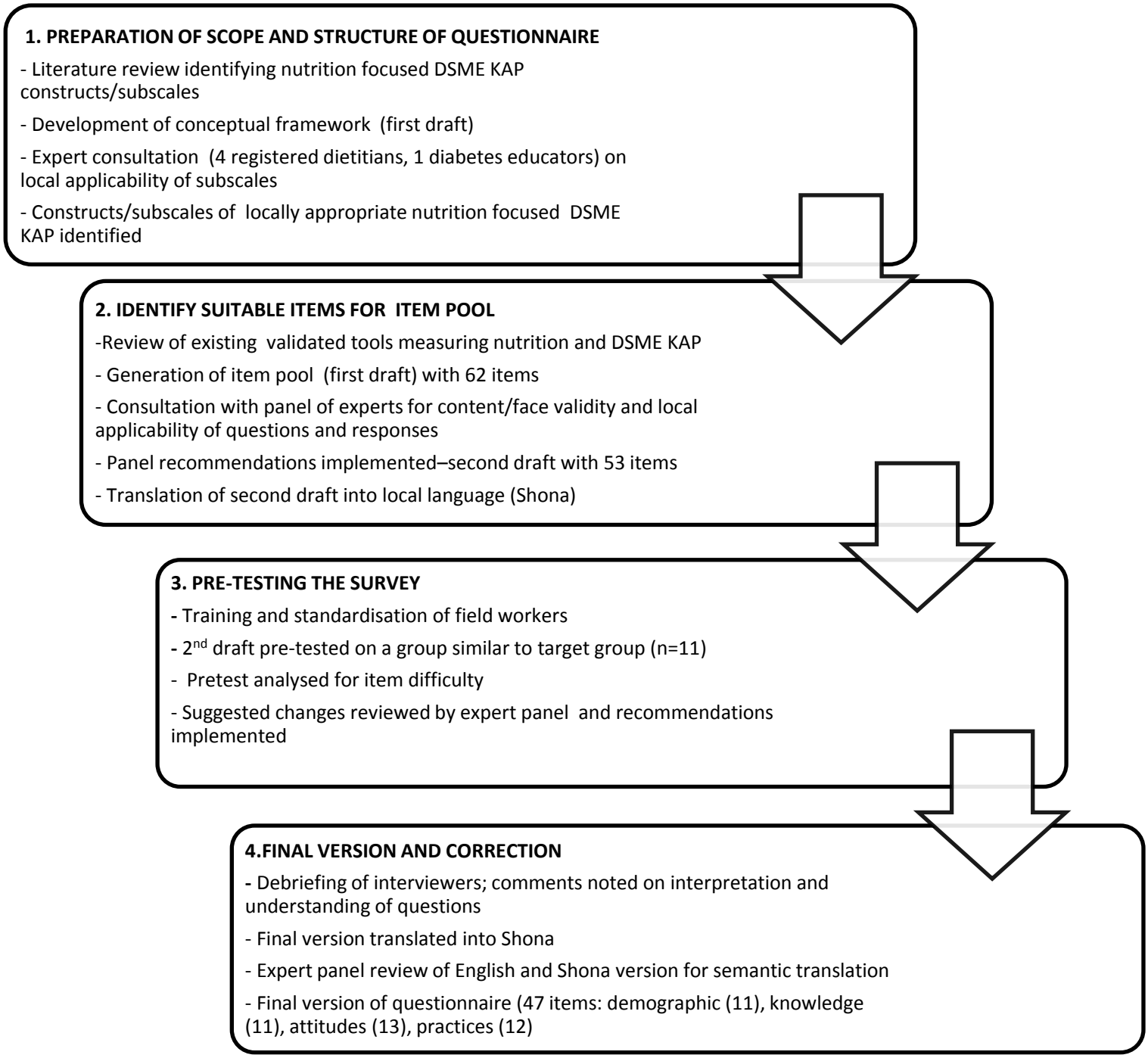
Table 2-4: Guidelines used to assess the feasibility of the questionnaire in the pre-testing phase[165]

Criteria	Explanations/Detail
Validity	Which questions were poorly understood by respondents/subject to multiple interpretations? Were they any leading questions?
Ease of administration	Were the questions easy for the fieldworker to read out? Did the questons follow a logical sequence i.e. read well? Were instructions clear to fieldworkers and respondents? Length of time taken to administer questionnaire Did respondent provide other responses not listed as options? Was there sufficient space for field worker annotations?
Respondent burden	Did respondents show impatience with completing survey? Did respondents refuse to answer certain questions? Were terms and concepts expressed in the questions culturally acceptable?

2.11.5 Final version and correction

The questionnaire was finalized after a final round of consultation with the experts and fieldworkers. The final version of the Shona questionnaire was) for semantic translation. Figure 2-6 is flow diagram describing the steps taken in the development of KAP questionnaire

Figure 2-6: Summary of key activities in development of nutrition focused DSME KAP survey



Source: (169) Adapted

CHAPTER THREE

RESULTS

This chapter presents the results of the patient KAP questionnaire and PCRS tool for health professionals. Tables and figures are used to illustrate the results according to the objectives of the study.

3.1 RECRUITMENT STATISTICS

The final sample included 154 T2DM patients from eight health public health facilities in Harare (two central hospitals and six city health clinics). The number of participants recruited from each site is shown in Table 3-1. Overall, 168 people were screened for eligibility in the study based on the inclusion criteria. Fourteen (14) participants either did not meet the inclusion criteria, refused to participate in the study, or in the case of the city health clinics, were unable to visit the clinic on the day that data collection took place. Higher rates of non-response were observed at city health clinics (n=11) compared to central hospitals (n=3), and the low density surburb clinics (Borrowdale and Highlands clinic) had comparatively higher rates of non-response compared to other clinics (Table 3-1).

Table 3-1: Screening and recruitment of type 2 diabetes participants by health facility

	Recruitment site	Number of Potential Participants Approached	Number Recruited	Response rate
Central Hospital Clinic	Harare Hospital	39	37	94.9%
	Parirenyatwa Hospital	41	40	97.6%
	Totals	80	77	96.3
City Health Clinic	Glen view Polyclinic	20	19	95%
	Rujeko Poly clinic	17	17	100%
	High fields Poly-clinic	17	17	100%
	Mbare Poly-clinic	16	13	81.3
	Highlands Clinic	9	7	77.8
	Borrowdale Clinic	9	4	44.4%
	Totals	88	77	87.5%

3.2 DEMOGRAPHIC DATA

Demographic results, disaggregated for clinic group, are presented in Table 3-2. The majority of respondent (66.9%, n=103) were female, while the mean age for all groups was 61.8 years (SD 12.7). Ages ranged from a minimum of 33 years to a maximum 89 years. On average participants that attended central hospital clinics were 5.2 years younger than those that attended city health clinics (p=0.02 by Mann Whitney test). The majority of participant in both groups had attained at least some primary education. Nearly 40% (n=57) had attained some secondary education, and fewer attained higher than ordinary level (O level education) (n=6). Seven (7) participants received no formal education. Duration of diabetes (i.e. self-reported time since diagnosis of diabetes) ranged from 2 months to 45 years across groups. No significant difference in the duration of diabetes between central hospital and city health attendees (p=0.77 by Mann Whitney test) was observed. The vast majority of patients were on oral medication (79.5%) while 20.5% used insulin. A higher proportion of patients from city health clinics (89.2%, n=66) were on oral medication compared to those attending central hospital clinics (70.1%, n=54).

Table 3-2: Demographic characteristics of patients with type 2 diabetes mellitus

Variable		Central hospital clinics		City health clinic		All groups	
		n	**%**	**n**	**%**	**n**	**%**
Gender n=154	Male	26	33.8	25	32.5	51	33.1
	Female	51	66.2	52	67.5	103	66.9
***Age, mean [SD] n=154**		59.2 [SD 13.2]		64.4 [SD 11.7]		61.8 [SD 12.7]	
		n	**%**	**n**	**%**	**n**	**%**
Education level n=153	Never went to school	4	5.2	3	3.9	7	4.6
	Completed some primary school	27	35.1	29	38.2	56	36.6
	Completed all of primary school	13	16.9	14	18.4	27	17.8
	Completed some secondary	16	20.8	13	17.1	29	18.9
	Secondary O level	15	19.4	13	17.1	28	18.3
	Post secondary	2	2.6	4	5.3	6	3.9
***Duration of diabetes n=154**		8.5 years [SD 9.2]		7.6 years [SD 7.3]		8.1 years [SD 8.3]	
		n	**%**	**n**	**%**	**n**	**%**
Type of medication n=154	Oral	54	70.1	66	85.7	120	77.9
	Oral/insulin	13	16.9	7	9.1	20	13.0
	Insulin	10	13.0	1	1.3	11	7.1
	Not on medication	0	0	3	3.9	3	1.9

*Age difference between central hospital clinic attendees and city hospital clinic attendees p=0.02 by Mann Whitney test
*Difference between central hospital clinics and city health clinics for duration of diabetes p=0.77 by Mann Whitney test

3.2.1 Nutrition education profile of participants with diabetes

The vast majority (90.3%, n=139) of participants reported receiveing some diabetes nutrition education from a health care institution (Table 3-3). However, fewer participants had consulted a diabetes educator (52.0%, n=80) or dietitian (49.0%, n=76). Fifty participants (32.5%) from the total sample had consulted both a dietitian and a diabetes educator and 106 (68.8%) had consulted atleast one of the professionals. Central hospital clinic attendees were more likely to have consulted a dietitian ($\chi2=10.61$, p=0.00 by Pearson Chi square test) or diabetes educator ($\chi2=12.31$, p=0.00 by Pearson Chi square test) compared to city health clinic attendees.

Education was predominately received from government institutions (93.5%, n=129), with the majority of these being educated at central hospital clinics (95.3%, n=123). Half of total sample (n=77) was educated at Harare hospital compared to nearly a third (n=46) at Parirenyatwa hospital. Only three participants cited a city health clinic as the source of education.

The majority of participants also reported receiving portion control guidelines (81.8%, n=126) and written dietary information on diabetes management (59.1%, n=91). Strong relationships between attending central hospital clinics and receiving written dietary guidelines ($\chi2=169.3$, p<0.00 by Pearson Chi square test) or receiving portion control guidelines from health professional ($\chi2=159.5$, p<0.00 by Pearson Chi square test) were observed.

Overall, 85% (n=131) of the total sample cited a health professional as their primary source of diabetes nutrition information, most frequently doctors, nurses and dietitians (Table 3-3). Nearly one in five (22.1%, n=77) of city health clinic attendees reported non-health professional sources of diabetes information (internet, media, non health professionals and no information) compared to 9.1% (n=7) from central hospitals. Furthermore, 12.3% (n=8) of city health clinic attendees reported receiving education privately, compared to 1.4% (n= 1) central hospital clinic attendees.

Table 3-3: Proportion of participants receiving diabetes self-management education

Variable		Central hospital clinics		City health clinics		All groups	
		n	%	n	%	n	%
Received diabetes nutrition education (n=154)	Yes	74	96.1	65	84.4	**139**	**90.3**
	No	3	3.9	11	14.3	**14**	**9.1**
	Do not know	0	0	1	1.3	**1**	**0.6**
Received written information on dietary management of diabates	Yes	57	74.0	34	44.2	**91**	**59.1**
	No	20	26	43	55.8	**63**	**40.9**
Received portion guidelines from a health professional	Yes	68	88.3	58	75.3	**126**	**81.8**
	No	8	10.4	16	20.8	**24**	**15.6**
	Do not know	1	1.3	3	3.9	**4**	**2.6**
Facility of education (n=138)	Government	72	98.6	57	87.7	**129**	**93.5**
	Private	1	1.4	8	12.3	**9**	**6.5**
Dietitian consultation (n=154)	Yes	48	62.3	28	36.4	**76**	**49.4**
	No	23	29.9	41	53.2	**64**	**41.5**
	Do not know	6	7.8	8	10.4	**14**	**9.1**
Diabetes educator consultation (n=154)	Yes	50	64.9	30	39.0	**80**	**52.0**
	No	20	26	41	53.2	**61**	**39.6**
	Do not know	7	9.1	6	7.8	**13**	**8.4**
Primary diet Information (n=154)	Media	4	5.2	6	7.8	**10**	**6.5**
	Internet	1	1.3	4	5.2	**5**	**3.3**
	Dietitian	25	32.5	15	19.5	**40**	**25.9**
	Doctor	27	35.1	27	35.1	**54**	**35.1**
	Nurse	16	20.8	17	22.1	**33**	**21.4**
	No information	1	1.3	3	3.9	**4**	**2.6**
	Non health worker	1	1.3	4	5.2	**4**	**2.6**
	Other health workers	2	2.6	1	1.3	**4**	**2.6**

3.2.2 Diet sheets

Most participants (59%, n=91) reported that they had received diet sheets on nutrition management of diabetes before. A higher number of central hospital clinic attendees (74%, n=57) compared to city health clinic attendees (44.1%, n=34) received diet sheets ($\chi 2$ 14.4, p=0.00 by Pearson Chi square test). Consultation with a dietitian was significantly associated with receiving a diet sheet ($\chi 2$ 41.46, p=0.00 by Pearson Chi

square test). However, consultation with a diabetes educator missed the significance mark (χ2 10.68, p=0.05 by Pearson Chi square test) for association with receiving with a diet sheet.

3.3 DIABETES KNOWLEDGE

3.3.1 Diabetes knowledge scores and clinic type

Table 3-4 displays the scores attained for each knowledge construct and subscale measured. The table further compares the levels of knowledge between clinic groups. The mean score for diabetes knowledge across groups was 69.4% ($\bar{x}$ 7.6 of 11). Participants attained higher scores for general diabetes knowledge compared to nutrition knowledge constructs (p-<0.00 by Wilcoxon test). This is also reflected by the higher scores attained for the prevention and complications knowledge subscales compared to the carbohydrate knowledge subscale (Table 3-4). The wide confidence interval for the insulin knowledge subscale (95% CI 42.0-71.0) likely reflects the small number of insulin users (n=30). Central hospital clinic attendees had statistically significant higher levels of knowledge in both nutrition (p=0.00 by Mann Whitney test) and general self-management constucts (p= 0.02, by Mann Whitney test). There were no significant differences found between clinic groups for knowledge on complications (p=0.06 by Mann Whitney test), prevention of diabetes (p=0.10 by Mann Whitney test) and insulin use (p=0.68 by Mann Whitney test) subscales. Only the carbohydrate knowledge subscale proved to be statistically different between clinic groups (p=0.03 by Mann Whitney test).

Table 3-4: Levels of nutrition and general self-management knowledge for two clinic groups

Final knowledge				
	Mean score		SD	p-value
	%	$\bar{x}$		
All groups (n=154)	69.0	7.6	2.5	
City health (n=77)	63.0	6.9	2.9	
Central hospital (n=77)	75.0	8.3	2.4	*0.00
Nutrition self-management knowledge				
All groups	62.0	3.1	1.4	
City health	56.0	2.8	1.4	*0.00
Central hospital	70.0	3.5	1.3	
Carbohydrate knowledge				
All groups	60.0	1.8	1.0	
City health	57.0	1.7	1.0	*0.03
Central hospital	67.0	2.0	0.9	
General self-management knowledge				
All groups	75.0	4.5	1.5	
City health	70.0	4.2	1.6	*0.02
Central hospital	80.0	4.8	1.2	
Prevention knowledge				
All groups	80.0	2.4	0.9	
City health	73.0	2.2	1.0	0.10
Central hospital	83.0	2.5	0.8	
Complications knowledge				
All groups	65.0	1.3	0.8	
City health	60.0	1.2	0.7	0.06
Central hospital	70.0	1.4	0.8	
Insulin use knowledge				
All groups (n=30)	55.0	1.1	0.5	
City health (n=7)	50.0	1.0	0.4	0.68
Central hospital (n=23)	60.0	1.2	0.5	

Significant differences: $p < 0.05$ at 5% significance level

3.3.2 Diabetes knowledge and consultation with a dietitian or diabetes educator

Table 3-5 shows the average score (with confidence intervals) for knowledge, comparing those who reported consulting with dietitians or diabetes educators and those that did not. Participants that had consulted a dietitian or diabetes educator had higher mean knowledge scores for all domains and subscales of knowledge assessed, including the total knowledge score, compared to those that did not consult a dietitian or diabetes educator (Table 3-5). The confidence intervals reveal that even the lowest scores for those that had consulted a dietitian were significantly higher than the upper scores for particpants that had not consulted a dietitian. Hence, all differences in knowledge

scores were statistically significant. Participants who did not know whether or not they had consulted with a dietitian had overall the lowest scores with the widest confidence intervals. Similar results were observed for consultation with a diabetes educator, with the exception of carbohydrate knowledge subscale, which missed the significance mark (p=0.06 by Kruskall Wallis test). Participants that consulted a dietitian had higher knowledge scores than those who had consulted a diabetes educator, although differences are not likely to be significant owing to overlapping confidence intervals.

Table 3-5: Relationship between consultation with a dietitian or diabetes educator and diabetes knowledge

Variable	Carbohydrate knowledge			Nutrition self-management		General self-management		Final self-management	
Consultation with a dietitian	**n**	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Yes	76	72.4	66.1-78.6	75	70-80	81.4	77.0-85.8	78.3	74.2-82.5
No	64	51.0	43.2-58.9	52	46-58	69.8	63.2-76.4	61.6	56.4-66.9
Do not know	14	45.2	23.1-67.4	49	26-72	62.1	44.1-80.2	56.0	36.5-75.6
P value Kruskall Wallis test		* p<0.00			*p<0.00		*p= 0.01		* p<0.00
Consultation with a diabetes educator	n	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Yes	80	66.7	60.2-73.0	70	65-76	82.1	43.9-79.7	76.7	72.7-80.7
No	61	57.4	49.0-65.8	57	50-63	68.0	61.1-75.0	62.9	57.0-68.8
Do not know	13	43.6	18.4-68.8	46	23-69	61.8	43.9-79.7	54.8	35.4-74.1
P value Kruskall Wallis test		p=0.06			* p=0.00		* p=0.00		* p=0.00

Significant differences: p < 0.05 at 5% significance level

3.3.3 Individual item score results

The response patterns for items that were considered knowledge gaps are shown in Table 3-6. More than half (3 out 5) of items related to nutrition self-management were incorrectly answered by more than 40% of the sample. It was found that 46.8% (n=72) of participants had poor levels of knowledge on identifying the highest source of carbohydrates from a list of foods. More than half of participants (55.1%, n=85) could not identify the food that would illicit the highest glycaemic response, while 47.4% (n=73) were unable to identify the highest source of fat from a list of foods. Participants

also showed low levels of knowledge on the indication for low fat diets in heart disease risk reduction (44.4%, n=68 answered incorrectly). Insulin users particularly struggled with identifying causes for low blood sugar (56.7%, n=17 answered the question incorrectly). Table 3-6 further shows that more participants that attended city health clinics answered questions incorrectly than central hospital clinic attendees.

Table 3-6: Knowledge gaps

Item	% Incorrect	Response options	(All groups)		City health		Central hospitals	
Nutrition self-management domain								
		Response option	n	%	n	%	n	%
Glycaemic response to food n=154	55.1% n=85	Cooking oil	57	37.0	33	42.9	24	31.2
		Sadza	**69**	**44.8**	**28**	**36.4**	**41**	**53.2**
		Salt	18	11.7	10	12.9	8	10.4
		Fish	2	1.3	1	1.3	1	1.3
		Do not know	8	5.2	5	6.5	3	3.9
Highest carbohydrate source n=154	46.8% n=72	Chicken	11	7.1	5	6.5	6	7.8
		Peanut butter	28	18.2	15	19.5	13	16.9
		Potatoes	**82**	**53.3**	**38**	**49.4**	**44**	**57.1**
		Rape (green leafy vegetable)	15	9.7	8	10.4	7	9.1
		Do not know	18	11.7	11	14.2	7	9.1
Highest fat source n=154	47.4% n=73	Honey	25	16.2	13	16.9	12	15.6
		Maize	11	7.1	6	7.8	5	6.5
		Milk	**81**	**52.6**	**34**	**44.2**	**47**	**61.0**
		Orange juice	10	6.5	7	9.1	3	3.9
		Do not know	27	17.5	17	22.1	10	13.0
General self-management domain								
Low fat food reduce risk for n=153	44.4% n=68	Eye disease	14	9.2	7	9.2	7	9.1
		Heart disease	**85**	**55.6**	**37**	**48.7**	**48**	**62.3**
		Kidney disease	8	5.2	1	1.3	7	9.1
		Lung disease	6	3.9	2	2.6	4	5.2
		Do not know	40	26.1	29	38.2	11	14.3
Causes of low blood sugar n=30	56.7% n=17	Too little exercise	2	6.7			2	8.7
		Too little insulin	7	23.3			7	30.4
		Too much food	2	6.7	1	14.3	1	4.4
		Too much insulin	**13**	**43.3**	**4**	**57.1**	**9**	**39.1**
		Do not know	6	20	2	28.6	4	17.4

*Correct answers to questions are in bold

Table 3-7 shows the distribution of responses for knowledge items that were correctly answered by at least 70% of the sample. No large differences in response patterns were observed between groups. The majority of participants could identify interventions to reduce the risk of diabetes such as regular exercise (85.8%. n=133) and eating less high sugar content foods (74.4%, n=120). Comparatively fewer participants correctly identified weight loss as intervention to prevent diabetes (71.0%, n=114). Two out five questions in the nutrition self-management subscale was answered correctly by more than 70% of participants, 78.1% (n=121) were able to identify the recommended macronutrient portion guidelines (the plate model). A substantial majority (84.5%, n=131) also understood that unrefined carbohydrates elicited a slower glycaemic response. Most participants (73.5%, n=114) were also able to identify an appropriate simple sugar to eat for the treatment of hypoglycaemia.

Table 3-7: Results of other individual questions

Constructs	Subscales	Questions	n	% Correct
General Self-management	Diabetes Prevention	Q2.1.1 Effect of weight loss on diabetes prevention	110	71.0 %
		Q2.1.2 Effect of eating less sugar on diabetes prevention	120	77.4%
		Q2.1.3 Effect of exercising regularly on prevention	133	85.8%
Nutrition self-management knowledge		Q2.2 Portion control	121	78.1%
	Carbohydrate knowledge	Q 2.4 Effect of unrefined carbohydrates on glucose control	131	84.5%
General self-management	Diabetes complications prevention	Q2.7 Treatment of hypoglycaemia	114	73.5%
		Q2.8 Effect of exercise on glucose control	129	83.2%
Insulin knowledge		Q2.11 Effect of injecting insulin and skipping meals on glucose control	22	71.0%

3.3.4 Other determinants of knowledge

Relationship between final knowledge score and primary source of diabetes nutrition information

Participants who cited dietitians as their primary source of nutrition knowledge, achieved higher final knowledge marks than all other primary sources of diet information (p=0.01 by Kruskall Wallis test). Mean final knowledge scores for participants that cited doctors and nurses as their primary source of knowledge were similar at 64.0% (SD 23.3) and 65.8% (SD 20.8) respectively (Figure 3-1). It was found that participants who reported that their primary knowledge source was the media (i.e. television, radio, newspapers and magazines) had the second highest knowledge score (75.4%, SD 21.4), while participants who reported not receiving information on dietary management, had the lowest total knowledge scores (45.4%, SD 26.8).

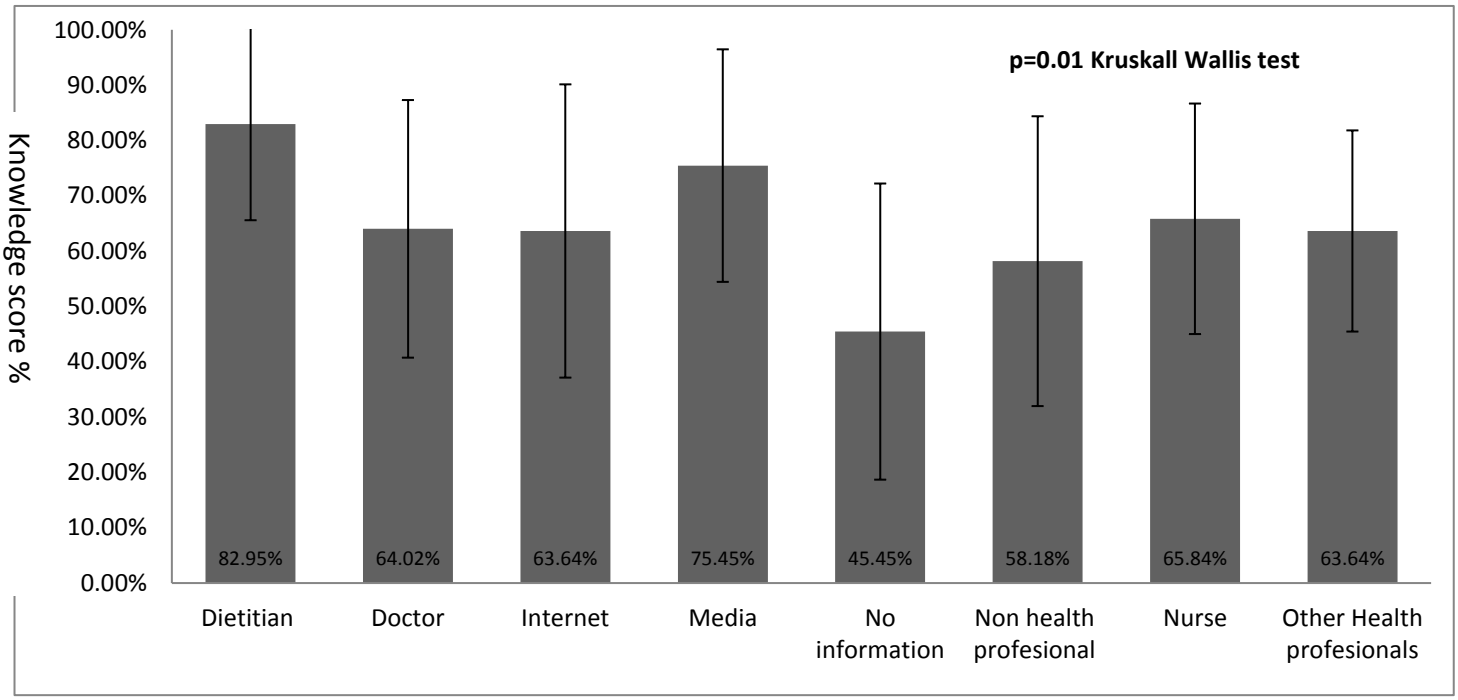


Figure 3-1: Relationship between final knowledge score and primary source of diet information

Final knowledge score and education level

Figure 3-2 shows that particpants with higher levels of educaton showed better knowledge on diabetes management (p<0.01 by Kruskall Wallis test).

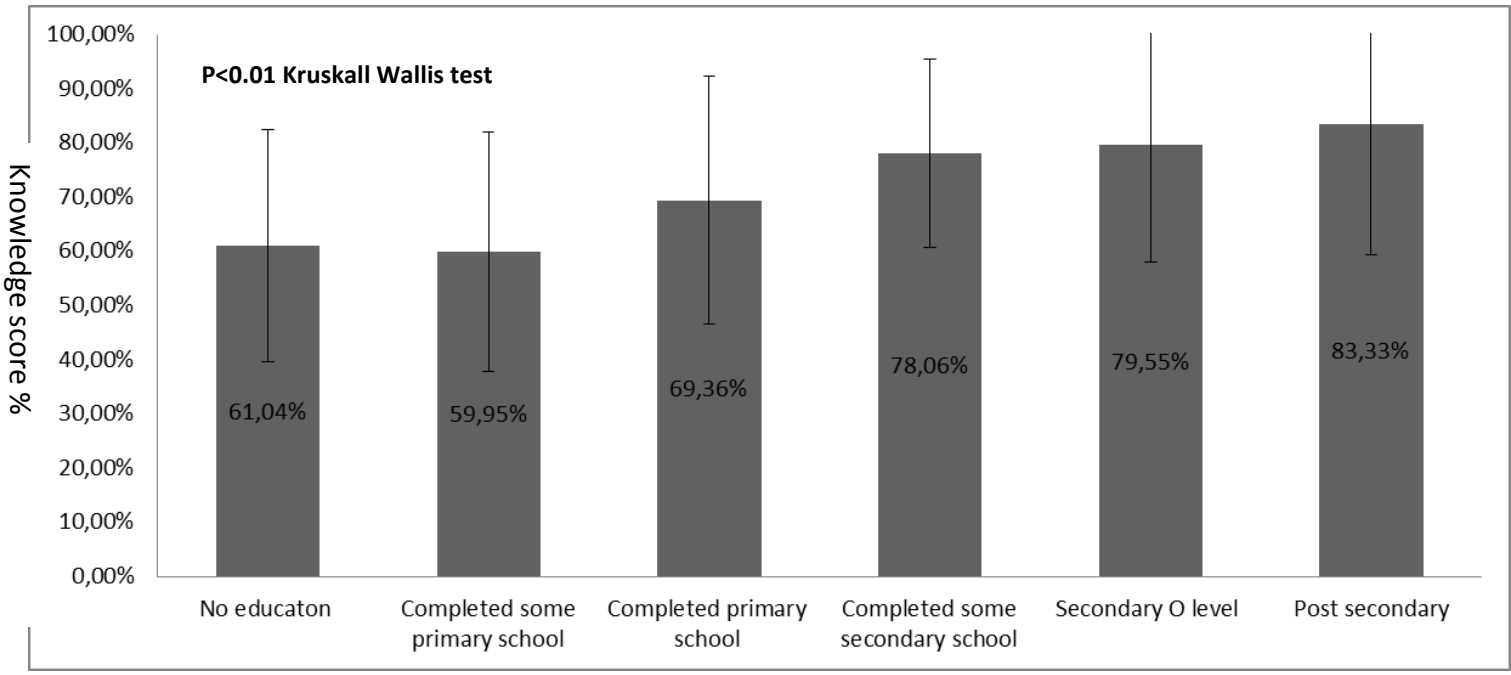


Figure 3-2: Relationship between final knowledge score and education level

Final knowledge score and type of medication, age and duration of diabetes

There were no significant differences observed between insulin users and non-insulin users (people on oral medication) with regard to final knowledge score (p=0.06 by Mann Whitney test). Insulin users (n=30) had a mean final knowledge score 67.6% (SD 18.6) and non-insulin users (n=123) had a mean final knowledge score of 76.3% (SD 23.5). It is noted that the group that did not use insulin was much larger than the group that did, which is likely to have contributed to the results obtained. Spearman's correlation coefficient was used to determine the strength of association between duration of diabetes, age and final knowledge scores. Age was moderately and negatively correlated with knowledge (r_s= 0.49, p=0.00), i.e younger age was moderately correlated with better knolwegde scores. A negligible, non-significant correlation between duration of diabetes and knowledge was found (r_s= 0.10, p=0.20).

3.4 DIABETES ATTITUDES

3.4.1 Diabetes attitudes and clinic types

Table 3-8 is a summary of mean scores for diet attitudes, general-self management attitudes and total attitudes, disaggregated per clinic group. Central hospital attendees had higher mean scores for the nutrition, general self-management and total attitude scales. However, there were no significant differences observed between clinic groups for total attitudes (p=0.10 by Mann Whitney test) and general self-management attitudes (p=0.17 by Mann Whitney test). Diet attitudes score of the two groups just missed the significance mark (p=0.05 by Mann Whitney test).

Table 3-8 : Attitudes towards diabetes self-management scores for clinic type

Variable	City health clinics	Central hospital clinics	p value	All groups	95% CI
Diet attitudes mean	3.47 [SD 0.52]	3.69 [SD 0.66]	0.05	3.58 [SD 0.60]	3.5-3.7
General self-management mean	3.97 [SD 0.47]	4.08 [SD 0.52]	0.17	4.02 [SD 0.49]	3.9-4.1
Total attitude mean	3.73 [SD 0.40]	3.90 [SD 0.47]	0.10	3.81 [SD 0.44]	3.74-3.89

3.4.2 Diabetes attitudes and consultation with a registered dietitian or diabetes educator

Participants who had a consulted a dietitian did not differ significantly from those that had not consulted a dietitian for diet attitudes (p=0.24 by Kruskall Wallis test), general self-management attitudes (p=0.60 by Kruskall Wallis test) and total attitudes (p=0.30 by Kruskall Wallis test). A similar relationship was observed for consultation with a diabetes educator (Table 3-9). The 95% confidence intervals shown in Table 3-9 also confirm that significant differences in attitudes between groups that consult dietitians or diabetes educators and those that do not, are unlikely to be found at a population level.

Table 3-9: Relationship between attitudes and consultation with a dietitian and diabetes educator

Consultation with a dietitian				
	Yes n=76	No n=64	Do not know n=14	p value Kruskall Wallis
Diet attitudes mean	3.67 [SD 0.62]	3.52 [SD 0.61]	3.39 [SD 0.44]	0.24
95% CI	3.53-3.81	3.37-3.67	3.14-3.65	
General self-management mean	4.06 [SD 0.52]	4.00 [SD 0.47]	3.92 [SD 0.50]	0.60
95% CI	3.94-4.18	3.89-4.12	3.63-4.21	
Total attitude mean	3.88 [SD 0.47]	3.77 [SD 0.42]	3.68 [SD 0.37]	0.30
95% CI	3.77-3.3.99	3.66-3.87	3.46-3.89	
Consultation with a diabetes educator				
	n=80	n=61	n=13	
Diet attitudes mean	3.67 [SD 0.64]	3.47 [SD 0.54]	3.54 [SD 0.62]	0.11
95% CI	3.53-3.81	3.33-3.61	3.16-3.91	
General self- management	4.07 [SD 0.52]	4.00 [SD0.44]	3.85 [SD 0.55]	0.33
95% CI	3.96 – 4.18	3.89 – 4.11	3.52 – 4.18	
Total attitudes mean	3.89 [SD 0.47]	3.74 [SD 0.40]	3.70 [SD 0.43]	0.19
95% CI	3.78-3.99	3.64-3.84	3.44-3.97	

3.4.3 Individual attitude item analysis

Table 3-10 shows the distribution of scores attained for individual attitude items for the entire sample of 154 patients. As shown in the table, the majority of participants exhibited positive attitudes on the importance of blood glucose control (96.8%, n=149), medication (96.8%, n=148), exersize (83.4%, n=129), and diet (95.5%, n=147) adherence. Despite this, half of participants (49.4%, n=76) found it difficult to follow a prescribed diet, and about a third (33.8%, n=52) felt that they did not have the skills necessary to manage their glucose. It is also worth mentioning that 15.7% (n=24) did not think that exersize was an important aspect of glucose management, and 46.8% (n=72) also felt that diabetes kept them from being as active as they would like to be. Equally concerning is that 19.5% of participants did not feel that weight loss for overweight indivduals would improve blood glucose control. Over 60% felt that diabetes and its treatment kept them from eating as much they would like (65.5%, n=101) and the foods that they like (71.4%, n=110). Despite this, most people (73.4%, n=113) still felt that it was possible to enjoy life and still keep tight blood glucose control.

Table 3-10: Frequencies of attitude responses for individual items

	Variable	1-2 Negative attitudes	3 Neutral	4-5 Postive attitudes
	General self–management (n=154)			
3.1	I think it is important to keep good blood glucose control	4 2.6%	1 0.6%	149 96.8%
3.3	My health depends on taking my diabetes medication	7 4.5%	7 4.5%	140 91.0%
3.4	Importance of exercise in glucose management (n=153)	13 8.5%	11 7.2%	129 84.3
3.6	I feel I have the skills necessary to keep my blood sugar in control	18 11.7%	34 22.1%	102 66.2%
3.9	Traditional/herbal medicine are more effective than medicines prescribed by doctors in treating diabetes	6 3.9%	31 20.1%	117 76.0%
3.10	My diabetes and its treatment keep me from being as active as I want	72 46.8%	7 4.5%	75 48.7%
3.13	In general I believe that most people can still enjoy life and keep tight blood glucose control	24 15.6%	17 11.0%	113 73.4%
	Diet self- management (n=154)			
3.2	I do not think that being overweight can make it harder for me to control my blood sugars	17 11.1%	13 8.4%	124 80.5%
3.5	Following a prescribed diet can help to keep my sugars under control	3 1.9%	4 2.6%	147 95.5
3.7	I find it difficult to follow a prescribed diet that helps control my blood sugars	64 41.6%	12 7.8%	78 50.6%
3.8	Diet is just as important as medication in controlling blood sugar	4 2.6%	2 1.3%	148 96.1%
3.11	My diabetes and its treatment keep me from eating the foods that I like	96 62.3%	5 3.2%	53 34.4%
3.12	My diabetes and its treatment keep me from eating as much as I like	107 69.5%	3 1.9%	44 28.6

3.4.4 Other determinants of attitudes

Relationship between education level and mean final attitude scores

The general trend shown in Figure 3-3 is that higher levels of education were associated with a slightly higher mean total attitude scores. However, this was not a statistically significant relationship (p=0.51 by Kruskall Wallis test). Standard deviations did not differ by more 0.5 points for each mean score, indicating little variability of scores.

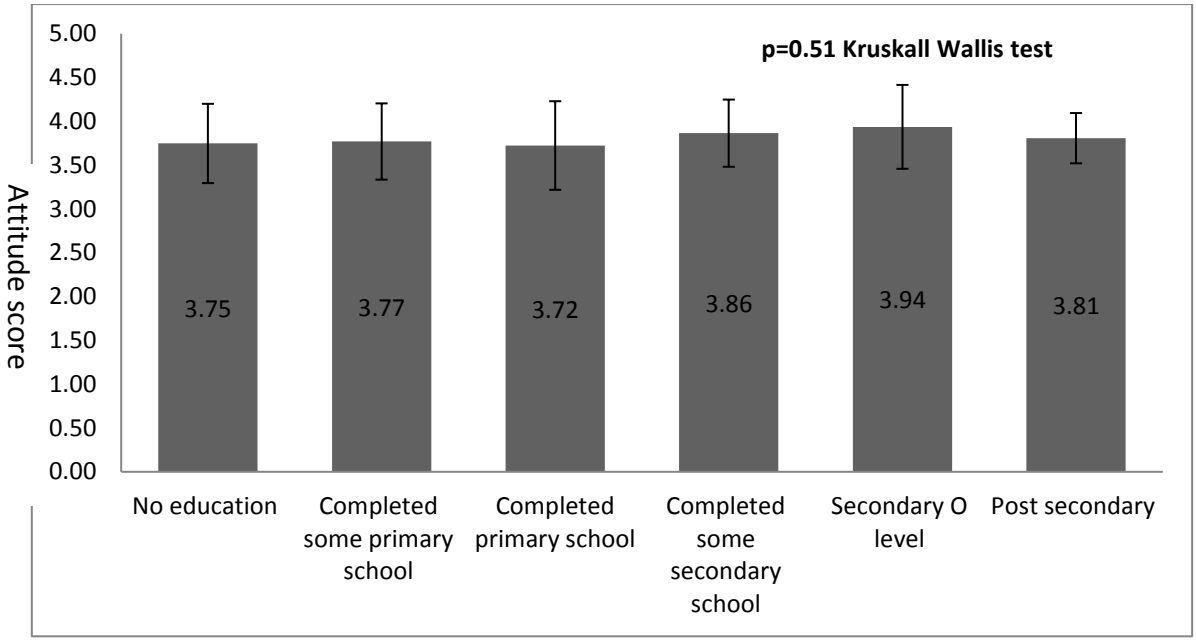


Figure 3-3: Total attitudes mean scores for levels of education

Relationship between primary diabetes nutrition information source and mean attitude scores

Figure 3-4 shows total mean attitude scores for primary sources of dietary information. People who reported that dietitians ($\bar{x}$ 3.95, SD 0.45) and other health professionals ($\bar{x}$ 3.95, SD 0.37) were their primary source of education had better attitudes scores than those who cited other sources of information, although this relationship was not significant (p=0.07 by Kruskall Wallis test).

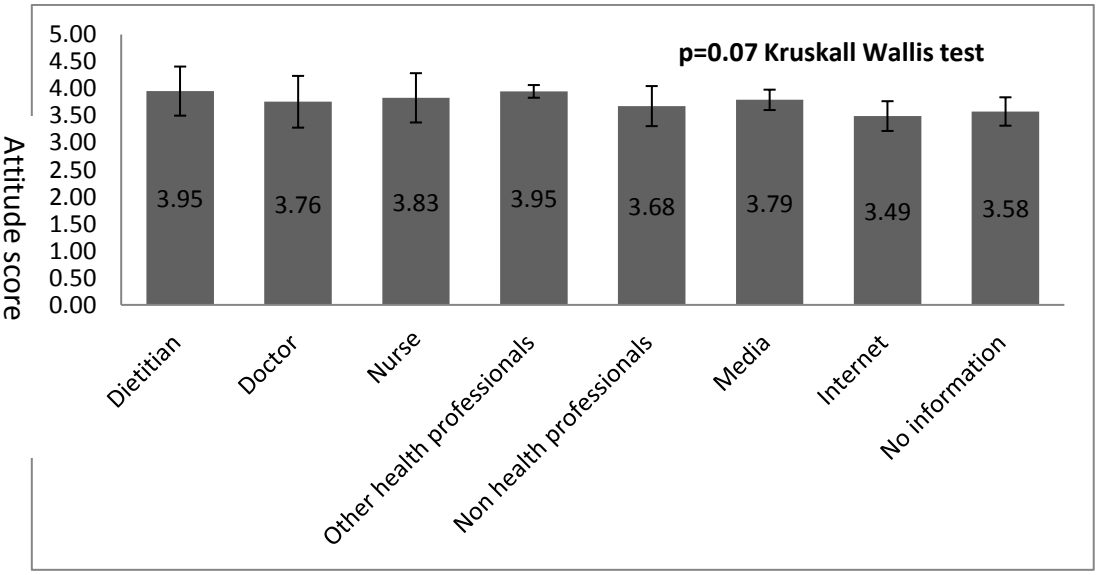


Figure 3-4: Mean attitude scores for primary source of diabetes nutrition information

Relationship between type of medication, age, duration of diabetes and mean final attitude score

No significant differences were found between insulin users ($\bar{x}$ 3.79, SD 0.44) and non-insulin users ($\bar{x}$ 3.82, SD 0.47) with regard to mean total attitude scores (p=0.78 by Mann Whitney test). Age had a negative weak correlation with diabetes attitudes (r_s -0.30, p=0.00) and, duration of diabetes also had a negative weak correlation with mean attitude score (r_s -0.19, p=0.02).

3.5 DIABETES PRACTICES

3.5.1 Diabetes practices (mean diet and physical activity adherence) and clinic type

A comparison between clinic groups (Table 3-11) shows that maean days (out of previous seven days) of adherence to diet guidelines was slightly higher in central hospital clinic attendees ($\bar{x}$ 3.90, SD 1.90) than city health clinic attendees ($\bar{x}$ 3.39, SD 1.72). The means days of physical activity adherence were identical for both groups. (Table 3-11). Hence, the differences between clinic groups for mean dietary adherence (p=0.11 by Mann Whitney test) and physical activity adherence scores were not significant (p=0.98 by Mann Whitney test). The standard deviations for both dietary and physical activity adherence differed considerably indicating high variability of adherence.

Table 3-11: Mean number of days of dietary and physical activity adherence

Variable	City health clinics	Central hospital clinics	All groups N=154	p value Mann Whitney test
Mean dietary adherence	3.39 [SD 1.72] 95% CI 3.47-4.33	3.90 [SD 1.90] 95% CI 2.99-3.78	3.64 [SD 1.82]	0.11
Mean physical activity adherence	2.82 [SD 2.10] 95% CI 2.32-3.32	2.82 [SD 2.22] 95% CI 2.34-3.30	2.81 [SD 2.15]	0.98

*Expressed as mean number of days out of previous seven days

Table 3-12 shows the frequencies of reported performance of diet and physical activity self-care behaviours in the previous seven days. The majority of participants reported performing the following behaviours for four or more days out seven: eating unrefined grains (59.7%, n=92), eating at least three portions of vegetables per day (56.3%, n=85) and being physically active (56.5%, n=87). However, a sizeable number had poor adherence to these behaviours i.e. adhered for less three days out of the previous seven

days (Table 3-12). The least performed behaviours were fruit consumption (76.6%, n= 118), adherence to diet sheets (54.6%, n= 84) and deliberate exercise (78.6%, n=121).

Table 3-12: Frequency of diet and physical activity self care activity adherence

			Percentage frequency distribution for adherence to self-care behaviours (mean days out 7 days)		
			0-3	**4-6**	**7**
Diet self care behaviours	Adherence to diet sheet (n=154)	n	84	15	55
		%	54.6	9.7	35.7
	Adherence to portion control guidelines (n=154)	n	74	19	61
		%	48.1	12.3	39.6
	Adherence to unrefined/whole grain foods(n=154)	n	62	17	75
		%	40.3	11	48.7
	Adherence to at least two fruits per day (n=154)	n	118	14	22
		%	76.6	9.1	14.3
	Adherence to at least three portion of vegetable per day (n=151)	n	66	27	58
		%	43.7	17.9	38.4
Physical activity slef-care behaviours	Frequency of physical activity (n=154)	n	67	32	55
		%	43.5	20.8	35.7
	Frequency of deliberate physical activity (n=154)	n	121	10	23
		%	78.6	6.5	14.9

3.5.2 Diabetes practices (physical activity and dietary adherence) and consultation with dietitian and diabetes education

Participants that had consulted with a dietitian reported higher levels of adherence to dietary guidelines ($\bar{x}$ 4.45, SD 1.56) than participants that had not consulted a dietitian ($\bar{x}$ 2.93, SD 1.75) or did not know whether they had consulted a dietitian ($\bar{x}$ 2.50, SD 1.54). These differences were statistically significant (p=0.00 by Kruskall Wallis test). Table 3-13 also shows that participants who consulted a dietitian, reported statistically significant higher levels of adherence to physical activity (p=0.02 by Kruskall Wallis test). In contrast, participants who had consulted with a diabetes educator did not have significant differences in mean dietary (p=0.47 by Kruskall Wallis test) and physical activity adherence (p=0.33 by Kruskall Wallis test), compared to groups that did not

consult a diabetes educator or did not know if they had consulted a diabetes educator (Table 3-13).

Table 3-13: Relationship between dietary and physical activity adherence and consultation with a dietitian and diabetes educator

Consultation with a dietitian	n	Mean dietary adherence	SD	95% CI	Kruskall Wallis p value
Yes	76	4.45	1.56	4.10-4.81	0.00
No	64	2.93	1.75	2.49-3.37	
Do not know	14	2.50	1.54	1.61-3.39	
		Mean physical activity			
Yes	76	3.28	2.11	1.78-4.01	0.02
No	64	2.26	2.15	1.72-2.80	
Do not know	14	2.89	1.93	1.78-4.01	
Consultation with a diabetes educator	n	**Mean dietary adherence**	SD	95% CI	Kruskall Wallis p value
Yes	80	3.83	1.71	3.44-4.21	0.47
No	61	3.42	1.84	2.95-3.89	
Do not know	13	3.54	2.40	2.09-4.99	
		Mean physical activity			
Yes	80	3.03	2.07	2.56-3.49	0.33
No	61	2.64	2.27	2.06-3.22	
Do not know	13	2.38	2.13	1.10-3.67	

*Significant differences: $p < 0.05$

3.5.3 Frequency of self-monitoring of blood glucose (SMBG)

Fifty participants (32%, n=50) reported that they monitored their blood glucose at least once a month. This was followed by those who monitor their blood glucose at least once three monthly (22%, n=32), which coincides with typical clinic review dates for government clinics. Frequent monitoring of blood glucose (i.e. at least once a day or week) was reported in 33% (n=51) of participants, while only a small percentage (5%, n=8) reported not routinely checking their blood glucose levels. Twelve (7%) participants reported monitoring blood glucose in the 'other' categories, which included on review dates (n=6) and only when sick (n=5). A strong association was observed between consulting a diabetes educator and frequent SMBG ($\chi 2=22.28$, $p=0.01$ by Pearson Chi square test).

3.5.4 Frequency of forgetting medication (medication adherence)

The vast majority (76%, n=117) of participants reported that they never forget to take their medication. . Nine percent (9%, n=14) of participants reported forgetting to take their medication at least once a month. Three percent (3%, n=5) of participants

answered in the 'other' category, which included forgetting to take medication only when sick and travelling. Three participants were not on any medication at the time of data collection. A non siginificant association was found between consultation with a diabetes educator and medication adherence ($\chi 2=13,79$, p=0.18 by Chi square test).

3.5.5 Frequency of use of alternative/traditional medicine use

The vast majority of participants (86%, n=133) reported that they never used alternative or traditional medicine to treat diabetes. Only 23 participants (14.9%) reported ever using traditional medicines at any point. Of these, ten reported using traditional medicines at least once a month. Most frequently cited anti-diabetic traditional medicines were ginger, okra and garlic. The rest of the thirteen reported infrequently using traditional medicine (less than once every 3 months).

3.5.6 Other determinants of diabetes nutrition practices

Table 3-14 shows the relationship between level of education, primary source of diet information and mean dietary adherence. No significant differences were found between level of education and dietary practices (p=0.26 by Kruskall Wallis test), although there was a trend for better adherence with higher education level. Participants who reported that their primary source of diet information was a dietitian, had higher levels of dietary adherence, compared to any other primary source of dietary information ($\bar{x}$ 4.67, SD 1.44). This relationship was found to be statistically significant (p<0.01 by Kruskall Wallis test).

Spearman's correlation test to determine the association between age, and self-reported mean adherence to diet self-care behaviours, showed a negative weak correlation with diet adherence (r_s 0.17, p=0.00). No relationship between duration of diabetes and diet adherence was observed (r_s 0.00, p=0.95). Weak negative associations were also found between age and physical activity adherence (r_s -0.39, p=0.00), and duration of diabetes and physical activity adherence (r_s -0.15, p=0.07).

Table 3-14: Other determinents of mean dietary practices

	n	Mean	SD	Kruskall Wallis test p value
Level of education				
No education	7	2.54	1.64	0.26
Completed some primary	56	3.38	1.89	
Completed primary	27	3.81	1.66	
Completed some secondary	29	3.54	1.70	
Secondary O level	28	4.26	1.95	
Secondary A level	1	6.2	-	
Postgraduate	5	3.9	1.05	
Primary source of diet information				
Dietitian	40	4.67	1.44	P<0.01
Doctor	54	3.36	1.83	
Internet	5	2.96	2.72	
Media	10	3.24	0.10	
No information	4	1.80	1.30	
Non health professional	4	2.20	1.26	
Nurse	33	2.38	1.84	
Other health professional	4	1.71	1.71	

3.5.7 Theme analysis of comments

A total of 135 participants made comments that are grouped into two main headers: comments on education received and challenges to adhering to self care behaviors (Table 3-15). With regard to comments on education received, 18% of participants were satisfied with the education received and felt that education has helped to maintain good blood sugar control. On the other hand, one in five participants felt that more education was needed. Participants expressed sentiments such as 'there is conflicting information about diet and diabetes, we are not sure what is correct', while others felt that more than one session with a dietitian was necessary.

Table 3-15 also shows that the biggests challenges to adherence cited were availability and cost of food items and medication. Participants particularly felt that fruits, vegetables, and whole grains were too expensive. One particpants remarked that 'there is no money to buy the things you are telling us to buy', and another patient stated that 'a diabetes diet is expensive'. Another emerging theme was non availability of medications due to frequent stock outs at clinics. One participant remarked that 'the government must do more for people with diabetes because medication always runs out at clinics. This forces us to have to go to expensive private doctors and buy

medication'. The most frequently cited challenge to adhering to exercise guidelines was joint pain/arthritis.

Table 3-15: Thematic content analysis for comments

n=135	Common themes	Number of participants	
		n	%
Comments on education received	Education has improved diabetes management	24	17.8
	More education is needed	29	21.5
Challenges to adherence to self-care behaviours	Availibility and cost of fruits and vegetables	19	14.1
	Unrefined mealie meal is expensive	7	5.2
	Unable to exercise	7	5.2
	Portion control is difficult	8	5.9
	Medication is expensive or not available at clinics	9	6.7
	Adherance to diet guidelines is difficult	8	5.9
	Recommended foods in diabetes diet are expensive	24	17.8

3.6 THE HEALTH PROFESSIONAL QUESTIONNAIRE (PCRS)

The recruitment statistics for health professionals are shown in Table 3-16. Thirty four health professionals were eligible to take part in the study at the time of data collection. Nineteen (19) health professionals were recruited and completed the PCRS form across the clinics sampled, which woked out to 55.8% of eligble health professionals. The health professionals were recruited as follows: three physicians, three nurses, and three dietitians for central hospitals and 11 nurses from city health clinics.

Table 3-16: Recruitment statistics for health professionals

	Recruitment site	Health professionals eligible	Health professionals recruited	Recruitment failure rate
Central hospital clinic	Harare Hospital	8	6	75%
	Parirenyatwa Hospital	6	3	50%
	Total	14	9	64.3%
City health clinics	Glen view polyclinic	3	1	33.3%
	Rujeko poly-clinic	3	-	100%
	Mbare poly-clinic	4	3	75%
	High fields poly-clinic	3	2	66.7%
	*Mufakose poly-clinic	3	2	66.7%
	Highlands clinic	2	2	100%
	Borrowdale clinic	2	1	50%
	Total	20	11	55%

*Pilot study performed at Mufakose poly-clinic. Pilot study data was included in the final analysis for the health professional's survey only.

3.6.1 Assessment of the level of primary care resources and support for diabetes self-management

Table 3-17 shows the mean scores attained for patient support and organisational support constructs in the questionnaire for health professionals. More than half of health professionals scored resources for patient (57.9%, n=19) and organisational support (68.4%, n=19) below 50%, indicating poor implementation of the characterstics for each domain. Specific patient support characteristics, e.g. goal setting, problem solving, emotional health assessment, social and community support, do not routinely occur according to most health professionals that completed the questionnaire. Organisational support factors, e.g. quality improvement, systems for documenting DSME, integration of DSME into primary care and continuing education for diabetes management, were also perceived to be incomplete, lacking in consistency and implementation. There was also a high degree of variability in the scores given by health professionals (Table 3-17).

Table 3-17: Mean scores for patient support and organisation characteristics

	Patient support characteristics	Mean	SD	Interpretation
Patient characteristic	Individualised assessment of patient's self-management educational needs	4.35	2.23	Is not standardised and does not consistently include most self-management components
	Patient self-management education	5.10	1.97	Plan is developed with patient (and family if appropriate) based on individualised assesmenet; is documented in patient chart; all team member generally reinforce same key messages
	Goal setting/action planning	3.55	2.28	Occurs sporadically or without tailoring to patient skills, culture, educational needs, learning styles or resources
	Problem solving skills	4.85	2.39	Are taught and practiced sprodically or used by only a few team members
	Emotional health	4.70	2.83	Is not routinely assessed; screening and treatment protocols are not standardised or are non existent
	Patient involvement	4.75	2.26	Is passive; clinician or educator directs care with occasional patient input
	Patient social support	3.75	2.07	Is discussed in general terms, not based on an assessment of patients individual needs or resources
	Linking to community resources	3.15	2.21	Is limited to a list or pamphlet of contact information for relevant resources
	Total 42.3%	**34.2 (out of 80)**		
Organization characteristic	Continuity of care	4.39	2.17	Is limited; some patinets have an assigned primary care provider (PCP);planned visits and routine lab work occur sporadically
	Coordination of referrals	4.72	2.70	Is sporadic, lacking systematic follow-up, review or incorporation into the patient's care plan
	On-going quality of care	3.39	2.25	Is possible because organised data are available, but practice has not initiaited specific quality imporvemnt projects in this area
	System for documentation of self-management support services	4.17	2.90	Is incomplete or does noy promote documentation (e.g. no forms in place)
	Patient input	4.00	1.71	Mechanisms exist, but are not promoted, input solicited sporadically
	Integration of self-management support into primary care	3.83	2.36	Is limited to special projects or to select teams
	Patient care team (internal to the practice)	4.17	1.76	Exists but little cohesiveness among team members
	Physician, team and staff self-management education and training	2.67	2.00	Occurs on a limited basis without routine follow up or monitoring
	Total 39.1%	**31.3 (out of 80)**		

3.6.2 Relationship between clinic group and patient/organisational support

Figure 3-5 is a comparison between central hospital clinics and city heath clinics with regard to patient and organisational support scores. Central hospital clinic staff consistently rated their patient support services as worse of than that of city health clinics. The differences in patient support and organisationalsupport scores between clinic groups were statistically significant (p<0.01 by Mann Whitney tests).

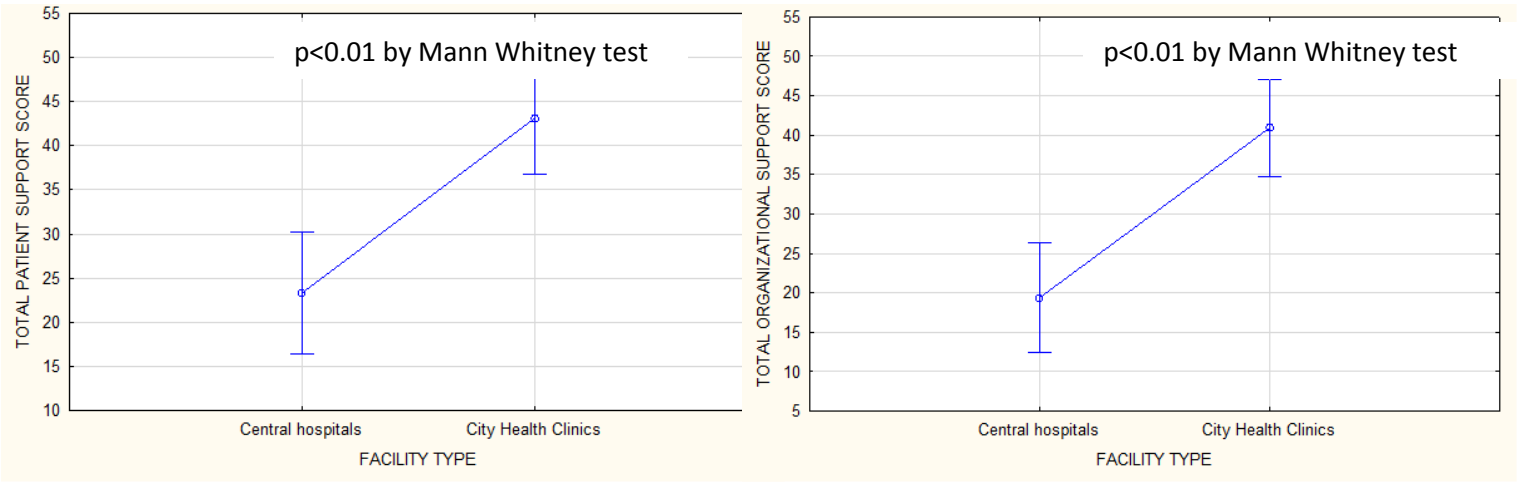


Figure 3-5: Comparison of organisational and patient support scores for clinic type

CHAPTER FOUR

DISCUSSION

4.1 DISCUSSION OF METHODOLOGY

4.1.1 Aims and objectives

This was an explorative study to assess and compare the extent of nutrition-focused DSME interventions in sampled public health facilities using patient knowledge, attitudes and practices as outcomes. As a determinant of the extent of DSME, primary care resources for DSME were assessed through a questionnaire for health professionals. The knowledge, attitudes and practices of two groups that were receiving care at central and city health clinics were compared based on their hypothesised exposure to nutrition-focused DSME interventions. In Harare, dietitians and diabetes educators who provide nutrition-focused DSME are found exclusively at central hospital clinics. The level of primary care resources for DSME was also compared between clinic groups. It was hypothesised that knowledge, attitudes, practices and the levels of resources for DSME support will not be different between clinic groups.

4.1.2 Study design

The cross-sectional study design used to meet the research objectives was cost- and time-effective but remained appropriate for determining the extent of DSME interventions in Harare and for making baseline comparisons between groups. Although efforts were made to measure the effects of multiple confounders (e.g. age, duration of diabetes, type of medication and education level), the cross-sectional design limited the control of other exposures that could affect outcomes. Also, causality cannot be established in cross-sectional studies.[170] Many similar studies that have assessed diabetes knowledge in patients use a final cut-off value for scores to determine the adequacy of knowledge.[128-130] However, owing to the paucity of previous data on diabetes knowledge in the current population and the new measurement tool that was designed, the researcher was unable to defend cut-off values. Instead, comparisons for constructs of knowledge, attitudes and practices were made with existing literature.

4.2 DEMOGRAPHIC CHARACTERISTICS

The demographic data showed clear trends for more females (66.9%, n=103), oral medication use (78%, n=120) and advanced age ($\bar{x}$ 61.8, SD 12.7). Hakim et al. also found a higher number of females with diabetes in Zimbabwe, while Zimbabwean

women with diabetes have also been reported to show increased health-seeking behaviour compared with men.[20,135] In addition, there is strong evidence demonstrating that women in sub-Saharan Africa are disproportionately affected by diabetes.[171] The trend observed for gender suggests not only the need for more targeted interventions for women but also the need to target interventions aimed at increasing the number of men in care. The mean age of participants in the current study is also consistent with the global age of T2DM onset (40 years and above).[172,173] Participants in the current study were clustered around primary to secondary level education, which shows consistency with the latest Zimbabwe Demographic Health Survey (ZDHS 2012).[174] A strong link has consistently been demonstrated between education level and health literacy, including knowledge, attitudes and practices.[128,130,132,175,176] However, education level did not have an impact on knowledge, attitudes or practices in the current study. The current study also found no evidence of a relationship between duration of diabetes or type of medication and knowledge, attitudes and practices. This is contrary to the findings of several similar studies.[130,132,177,178]

4.3 DETERMINING IF PATIENTS RECEIVE NUTRITION-FOCUSED DIABETES EDUCATION

The majority of participants (90.3%, n=139) reported that they received some nutrition-focused DSME including portion-control guidelines (82%, n=126) from a health professional. Moreover, most participants (80%, n=123) reported being educated at central hospital clinics (Harare or Parirenyatwa hospitals), with Harare Hospital being the primary site of education for 50% (n=77) of all participants. Only three participants reported being educated at city health clinics. Indeed, most city health clinic attendees (66.2%, n=51) reported receiving education from a central hospital, indicating high levels of 'crossover' of patients between clinic groups and over-reliance on central hospitals for education. Hence, the data support that patients do receive nutrition-focused DSME at central hospital clinics, while very limited DSME occurs at city health clinics. This is a major finding because the organisation of health care in Zimbabwe is such that central hospitals should be managing complicated cases of diabetes, and the bulk of the needs of people with diabetes (including basic education) should be taken care of at primary level (i.e. city health clinics).[135] A few patients made comments to this effect. For example, one patient stated that he felt that the education

he received at Parirenyatwa outpatient clinic should have continued when he was transferred to his local clinic.

Receiving written information on dietary guidelines for the management of diabetes and receiving portion-control guidelines from a health professional were other indicators used to determine if patients received nutrition-focused DSME. Over one-half (59.1%, n=91) of the total sample reported receiving written dietary guidelines in the form of diet sheets. Diet sheets are typically prepared by dietitians or diabetes educators as tools to reinforce education/counselling sessions although it is acknowledged that written dietary guidelines are sometimes distributed by non-health professionals (e.g. on the Internet).[179] Nevertheless, attending a central hospital-based clinic was highly associated with receiving both written dietary information and health professional advice on portion control. This adds further weight to the evidence that more DSME occurs at central hospital clinics than city health clinics.

4.4 DETERMINING IF DSME PROGRAMMES WERE IN PLACE AT SAMPLED PUBLIC HEALTH FACILITIES

Another major finding that relates to the first objective of this study regarding health professionals/facilities was that there was no evidence of the existence of DSME programmes with a focus on MNT at the sampled facilities. Although it is clear that DSME interventions occur at central hospital clinics, it is difficult to audit such services because there is no documentation in the form of policy, curriculum, objectives and outcomes.[180] The health professionals in the current study confirmed the lack of structured DSME by consistently rating the quality of 16 organisational and patient-support characteristics of successful DSME programmes as '*not routine and limited in scope*'.

The lack of standardised DSME has been described across southern Africa.[12] In neighbouring South Africa, DSME was described as ad-hoc and highly inconsistent in scope and structure.[11] Patients receive anything from a planned educational talk to spontaneous pieces of information that are subject to variation depending on the time and motivation of the health professional.[11,12] The evidence from the current study shows a similar situation in regard to DSME interventions in Harare. However, it is

worth noting that participants in the current study expressed positive sentiments on their education experiences. Patients made remarks such as "nurses [diabetes educators] at Harare Hospital are doing a good job of educating us on how to manage our diabetes" and "the session with the dietitian has helped me choose foods that don't raise my blood sugar too much". Another patient stated, "I am no longer admitted into hospital frequently after receiving education at Harare Hospital". Similar sentiments on the helpfulness of DSME were echoed by 18% of participants. Nevertheless, DSME provided at sampled health facilities does not meet the programme characteristics that are outlined by the ADA, IDF and the CCM approach.[6,121,181] The IDF argues that even in low resourced settings, DSME interventions should be structured (i.e. with a written curriculum, clear objectives and mechanisms for evaluating clinical and process outcomes) and be administered over a given time frame.[181]

4.4.1 Consultation with a dietitian or diabetes educator

Latest estimates place the population of Zimbabwe at nearly 13 million people who are serviced by only 10 registered dietitians.[182] Hence, the number of participants who had consulted a dietitian in the current study (49.4%, n=76) was considerable and comparable with similar studies performed in countries with better health resources (Malaysia and Lebanon) than Zimbabwe.[183,184] Similarly, the number of patients that had consulted a diabetes educator compared favourably with American data.[185] A minority of patients had no notion regarding diabetes educators or dietitians, which speaks favourably to the visibility of both professionals as part of the diabetes management team. Patients generally found consultation with both professionals helpful. Nonetheless, some commented on the need for follow-up education. One participant remarked that "I lost my diet sheet several years ago, and I have forgotten most of what the dietitian said". Several patients expressed that the type of food and the portion sizes recommended were not easy to adhere to owing to financial constraints, non-availability of food (especially fresh fruit, vegetables and whole grain starch options) as well as portions being too small.

4.5 ASSESSING THE MANAGEMENT OF NUTRITION-FOCUSED DSME THROUGH KNOWLEDGE, ATTITUDES AND PRACTICES IN THE CURRENT STUDY

4.5.1 Knowledge

Participants were more knowledgeable in the general self-management construct compared with the nutrition self-management ($p<0.00$) construct. This compares with other African studies that show gaps in nutrition knowledge compared with knowledge in other aspects of diabetes.[128-130] Participants across groups showed high levels of knowledge for diabetes-prevention strategies, portion control (through identifying the appropriate macronutrient distribution on a plate), treatment of hypoglycaemia and effects of unrefined carbohydrates on glucose control. Most participants could identify correct portion sizes on the plate model, which strengthens the evidence on the effectiveness of the plate model in portion-control education.[109,110]

However, major gaps in the knowledge of carbohydrate sources and their effect on blood glucose control were shown. More than one-half of participants (55.1%) could not identify that carbohydrate containing foods had the greatest effect on glycaemic response, while 46.8% could not identify the highest source of carbohydrates from a list of foods. This is of major concern, owing to the importance of carbohydrate awareness and management for good glycaemic control.[43] However, similar low carbohydrate awareness has been demonstrated in several populations, including populations in Nigeria[132] and Malaysia.[161] For example, in Nigeria, 67% of a sample could not identify potatoes as the highest source of carbohydrates from a list of foods.[132] Furthermore, nearly 40% of the current study participants mistakenly believed that cooking oil (a fat) had the greatest effect on glycaemic control, and 47.4% could not identify milk as the highest source of fat from a list of foods. Such misconceptions have been shown to be prevalent in other populations and negatively affect the management of diabetes.[161,178,186] The 58% of insulin users that could not identify the correct cause of hypoglycaemia appears high in contrast to other populations that were asked the same question.[178,187] This could be attributed to the small numbers of insulin users (n=30) in the current study.

4.5.2 Attitudes

The vast majority of participants showed positive attitudes towards the importance of glucose control, adherence to medication, diet and physical activity. However, fewer participants had positive attitudes towards their own perceived ability to carry out self-care behaviours. This is demonstrated by one-half of the participants admitting difficulty in following a prescribed diet and slightly over one-third (33.8%) not feeling they had the skills necessary to achieve good glycaemic control. In addition, most respondents felt that diabetes and its treatment prevented them from eating as much they would like (69.5%, n=107) and foods that they would like (62.3%, n=96), which may be contributing reasons for why patients found diet adherence difficult. Studies in Botswana and Malaysia also showed that feelings of insufficient food and an inability to control cravings were factors that contributed to perceived difficulties in diet adherence among T2DM patients and the resultant poor control of diabetes.[188,189] Difficulties in adhering to diet guidelines have also been shown in several other populations with diabetes around the world.[145,146,190-193] These findings highlight the need for a collaborative approach between health professionals and patients for identifying barriers in adherence to self-care behaviours and problem-solving.

However, positive attitudes towards medication adherence and the importance of glycaemic control were more prevalent in the current study compared to other similar studies.[185-187,194] For example, only 10% of participants in a Filipino study believed that tight blood glucose control was important.[194] It has also been reported that many T2DM patients feel that prescribed medications are unnecessary and too complicated.[145,146,195] The belief in the effectiveness of traditional medicines compared with prescription medicines in diabetes management is widely reported across Africa and is documented in two Zimbabwean studies.[133,150,151,196] In contrast to this, most patients in the current study (76%, n=117) felt strongly that doctor-prescribed medications were more effective than traditional medicines, and the use of traditional medication was not prevalent. A possible reason for this contrast to available literature is that the current population is urban with more exposure to Western medicine than rural populations. The majority of Zimbabwe's population resides in the rural areas, which makes it difficult to generalise the current results beyond Harare.[182]

4.5.3 Practices

The current study found that adherence to the self-care behaviours of diet and physical activity were sub-optimal compared with medication adherence. The majority of participants had poor adherence to behaviours regarding recommended fruit consumption (76.8%, n=118), diet sheets (54.6%, n=84) and deliberate physical activity (78.6%, n=121). Eating at least three portions of vegetables daily, portion-control guidelines and consumption of whole grains were more frequently performed, although at least 40% had poor adherence to these behaviours.

Literature presents many definitions of good and bad adherence with as many approaches to measuring adherence in people with diabetes.[147,151,197-202] This makes it difficult to compare adherence rates across studies and populations. Nonetheless, most literature from around the world describes sub-optimal adherence to self-care behaviours, particularly relating to diet and physical activity, as was found in the current study.[145,147,197,200,203] Physical activity adherence is also consistently the least performed self-care behaviour among people with T2DM, as was found in the current study.[145,147,197] Age and illness (e.g. joint pains and muscle stiffness) were frequently cited in the current study as reasons for not performing regular physical activity. This may be attributed to the average age of the participants (61.8 years) since co-morbidities such as arthritis may also exist and restrict movement. The attitudes component also revealed a sizeable number of participants who felt that diabetes and its treatment prevented them from carrying out physical activity, which likely contributed to the low levels of self-reported deliberate physical activity.

Medication adherence in the current study was high (76% reported never forgetting to take their medication). By comparison, adherence to diabetes medication ranged from as low as 23% to as high as 77% in other African populations.[204,205] More objective measures of adherence (e.g. pill counts and medication possession ratios) have shown much lower levels of adherence, which demonstrates the unreliability of self-reported adherence to behaviours.[198] Several participants in the current study cited frequent stock outs of medication at clinics (particularly at city health clinics) as a reason for poor adherence to medication. Such challenges have been cited in other studies in resource-limited countries, including Zimbabwe.[150,151,204-205]

Fruit and vegetable consumption patterns appear to be more related to regional and cultural food norms.[206] African populations have very low levels of fruit and vegetable consumption compared with populations in other regions of the world.[207-209] Low consumption of fruits and vegetables in the current study, therefore, seems consistent with the regional trends. Socio-demographic factors, particularly affordability and access to food are major barriers in adherence to guidelines.[150,151,188,190] Affordability of recommended amounts of fruits and vegetables was consistently cited as a significant barrier to adherence in the current study. Many participants also cited non-availability of food (e.g. brown rice, mealie meal and bread) as a barrier to adherence.

Literature shows no advantage of frequent self-monitoring in patients with T2DM on oral medication.[210] Hence, reported frequency of SMBG cannot be compared directly with a standard in T2DM. Nonetheless, most participants reported checking their blood glucose levels at least once every three months, which coincided with the three-monthly clinic review dates. In line with the findings for the attitudes component, participants reported very low use of traditional medicines. This trend is supported by Hjelm et al. who found that urban Zimbabweans do not frequently use traditional medicine.[150] This may not necessarily reflect the practices of the majority of Zimbabweans who are largely rural. The most cited remedies were garlic and ginger. Hjelm et al. also found that garlic is frequently used as a traditional medicine in Harare.[150]

4.6 COMPARING KNOWLEDGE, ATTITUDES AND PRACTICES IN PATIENTS THAT RECEIVED DSME COMPARED WITH THOSE THAT DID NOT

Central hospital clinic attendees had significantly higher levels of knowledge than city health clinic attendees for the final knowledge score ($p<0.00$), nutrition self-management ($p<0.00$) and general self-management ($p=0.02$) constructs of knowledge. However, no significant differences in attitudes scores were observed between clinic groups ($p=0.10$). Central hospital clinic attendees had slightly higher scores for diet attitudes. However, the differences were not significant ($p=0.05$). Also, clinic group did not affect levels of diet ($p=0.11$) or physical activity adherence ($p=0.98$).

Consulting a dietitian or diabetes educator was also associated with higher overall knowledge scores, while only consultation with a dietitian was associated with better knowledge of carbohydrates ($p<0.00$). Consultation with a dietitian or diabetes educator did not affect attitudes, and only consultation with a dietitian was associated with improved diet ($p=0.00$) and physical activity adherence ($p=0.02$). The limited impact that DSME interventions had on patient attitudes and practices (with the exception of dietetic interventions) is an area of concern, particularly with the overwhelming evidence supporting the effectiveness of dietitian and diabetes educator interventions in improving all-round outcomes in patients with diabetes.[43,76,77,211,212] In the current study, only patient knowledge was convincingly improved with education.

Potential reasons for the limited impact of DSME on patient attitudes and practices may relate to the quality and characteristics of DSME (e.g. frequency of education, individualised vs. group, etc.). There is wide consensus that on-going DSME is associated with better outcomes, particularly in regard to motivating behaviour change.[76,77,213] It is, therefore, likely that this may be key for attitude and behaviour change in patients who receive DSME. Patients in the current study commented on the need for more frequent education. Sentiments such as “seeing the dietitian was helpful; however I can no longer remember most of what she said” and “the dietitian came and educated me in hospital, but I was very sick and could not listen” show the limitations in current DSME interventions (i.e. the lack of follow-up).

Similar to the findings in the current study, two other studies found that DSME had limited impact on changing patient attitudes towards diabetes.[2,214] This has led to the growing interest in incorporating behavioural theory into DSME.[78,215] Motivational interviewing in DSME has already shown early success in positively affecting attitudes.[212] Reasons why diabetes educators appeared to be less effective in behaviour change aspects relative to dietitians are not fully understood. However, it could be that diabetes educators more frequently perform group education compared with the individualised education performed by dietitians. Individualised education is associated with more durable changes in behaviour.[79,215] Another reason could be that participants who consulted a dietitian are prone to over reporting adherence to diet behaviours because they have a better knowledge of diabetes management.

4.7 ASSESSING THE LEVEL OF PRIMARY CARE RESOURCES AND SUPPORT FOR DIABETES EDUCATION

Nineteen health professionals (14 nurses, 3 dietitians and 3 physicians) out of a possible 34 completed the PCRS tool, corresponding to a 56% response rate. The high turnover of staff at clinics made it difficult to follow up on completion of the tool. Furthermore, non-response rates among health professionals are at least 10% above that of the general population.[216]

Patient and organisation support and resources for DSME are important determinants of the quality of DSME. Moreover, direct links between characteristics of organisational support and patient behaviour change and improved glucose control have been demonstrated.[217-218] The present study found that health professionals rated both organisational and patient support factors of care as sub-optimal. Patient support factors such as goal setting, assessing emotional health, linking patients to community resources, involving patients in decision-making and equipping them with problem-solving skills were all rated at quality level C. This corresponds to a lack of standardisation and consistency and limitations in all aspects of service delivery. Likewise, organisational support such as continuity of care, coordination of referrals, ongoing quality improvements, education and training of health professionals and systems of documentation of self-management support services were inconsistent, limited and lacking in standardisation. It can, therefore, be concluded that health professionals rated their compliance with CCM components as below par, which evidence suggests is likely to correlate with equally poor patient outcomes.[218] The lack of a systematic approach in supporting DSME could significantly contribute to the outcomes observed for patient attitudes and practices. Factors such as postgraduate training for health professionals in order to improve their knowledge and skills in delivering DSME are also important elements of providing quality DSME services.[217] Yet nearly one-half (9/19) of the health professionals reported that training of health professionals does not occur at all.

4.9 COMPARING RESOURCES AND SUPPORT FOR DSME BETWEEN CLINIC TYPES

Despite the evidence to show that more DSME interventions occur at central hospital clinics compared with city health clinics, health professionals at the central hospital

clinics rated the quality of services and resouces for support significantly lower than their counterparts at the city health clinics. Reasons for this warrant further investigation. As mentioned previously, the existence of established DSME programmes that meet the criteria to be described as a programme and not an intervention could not be found.

4.8 STUDY LIMITATIONS

Steps to ensure content validity and reliability of the T2DM patient questionnaire were taken through two rounds of seeking expert consensus on items, adaptation of existing validated questionnaires and pre-testing the survey on the intended population. However, given that it was a new instrument intended for a population in which no validated instruments for the measured constructs exist, test-retest reliability, internal reliability and construct validity were important to determine. Nonetheless, validation of the questionnaire was not an objective in the present study.

Another limitation to a measuring tool that is researcher designed is that the results are not always directly comparable with existing literature, which to a certain extent, limits the interpretation of data. Existing validated surveys that measure all three dependant variables (diabetes knowledge, attitudes and practices) with a focus on nutrition are scarce.[134,219] Furthermore, none of the existing validated surveys were deemed appropriate for the population in this study since they focus on concepts that the expert panel deemed too complicated for the local population.[134, 219]

A researcher-administered questionnaire has the advantage of ensuring equal participation for people who are unable to complete the survey on their own (e.g. people with a low education level). However, a disadvantage was that participants may have been inclined to respond in what they perceived to be the more socially desirable way or to agree to statements to please the researcher (acquiescence bias). This may have been a problem in the attitude and practices component in which participants may have over/under exaggerated their attitudes and levels of adherence.

The low response rate of health professionals limits the generalisability of the findings due to the small sample size. It is also unknown to what extent the non-respondents are likely to differ from the respondents in regard to their perceptions of the

implementation of the items in the PCRS tool. There is also a possibility of recruitment bias since participants from city health clinics had to be invited to the clinics to participate. It is also unkown how the participants who were able to come to the clinic differed from those who were not. The researcher, therefore, acknowledges that the differences in methodology in recruiting patients from city health clinics and central hospital clinics could have affected the outcomes of this study.

4.9 RECOMMENDATIONS

1. Future research should focus on how to scale up the implementation of DSME interventions in Harare, given the limited number of dietitians and diabetes educators. Resoures permitting, more posts for dietitians should be opened, especially in the city health clinics. Dietitians and diabetes educators could also lead DSME training for other health professionals, particularly on nutrition management, an area in which many patients lacked knowledge and had poor practices in the current study. Training should include dietary management and cognitive behavioural theories that enhance adherence to self-care behaviours.
2. It is also recommended that DSME interventions should be standardised with curricula, systematic documentation and written objectives, and mechanisms to measure outcomes should be developed for public health clinics in Harare. This would fascilitate more frequent appraisals of DSME and quality improvement.
3. A larger sample size of health professionals completing the PCRS tool to audit DSME sevice is recommended to obtain more conclusive results. This data can also be used in programme planning and subsequently, for evaluating outcomes of new interventions.
4. The KAP survey tool used should be tested for reliability and validity in the local population. This would be extremely useful to future researchers and programme evaluators.

CHAPTER FIVE

Conclusion

5.1 CONCLUSION

This study serves an important baseline for assessing the situation with regard DSME, the resources available and the outcomes of current DSME services in Harare, Zimbabwe. This information is vital for planning interventions aimed mitigating gaps in knowledge, attitudes and practices of people with T2DM, and improving glycaemic control. Diabetes is a growing public health concern in Zimbabwe and self-management education and support is considered essential for optimal glucose control. The current study was unable to determine the existence of structured DSME, although evidence of DSME interventions was found at central hospital clinics. Moreover, health professionals revealed weighty health care system barriers to successful management of diabetes which must be addressed through improved DSME training for health professionals and allocation of resources for DSME.

A major finding of this study is that DSME interventions that are currently in place are impacting positively on patient diabetes knowledge. However, interventions have limited impact on attitudes and practices. Hence the first null hypothesis that there are no differences in knowledge attitudes and practices in people who have received DSME compared to those that have not was rejected for knowledge but not rejected for differences in attitudes and practices, with the exception of dietetic intervention which improved both knowledge and practices. Interventions by dietitians were therefore more effective in improving the measured outcomes than other interventions. The second null hypothesis was rejected i.e there was a significant difference in primary care resources between facilities with DSME interventions (central hospital based clinics) and those with limited DSME intervention (city health clinics). Further exploration on why resources at central hopsitals were perceived to be worse than that of city health clinics is warranted.

The current study found gaps in nutrition knowledge, attitudes and practices in relation to other self care behaviours and patients cited that recommendations made by health professionals were not always easy to implement in their daily lives owing to various barriers, particulalry socio-economic challenges. These findings highlight the need for more comprehensive DSME services that are individualized to the patients

circumstances, incorporate ongoing support, behavioural change theories and frequently evaluate patient outcomes for quality improvement.

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APPENDIX 1: Nutrition focused diabetes self-management education questionnaire-English

Participant Number							Date Form					1	5

Clinic/Facility.....

Nutrition Focused Diabetes Self-Management Education Knowledge, Attitudes and Practices Questionnaire

OBJECTIVE

This survey was developed to compile information on the knowledge, attitudes and practices of people living with Type 2 Diabetes regarding self-management of their condition. The survey focuses on the nutritional management of diabetes. You will be asked to choose the most appropriate responses (i.e. response that applies most to you or most correct answer) from a variety of response categories which will all be read out to you. The survey typically takes about 20-30 minutes to complete.

PART A: DEMOGRAPHIC INFORMATION

In this section you will be asked to answer questions about yourself and a history of the treatment you have sought for your diabetes, which includes whether you have consulted health care professionals on how to eat for controlling your blood sugars.

1.1	What type of Diabetes do you have? Verify what type of Diabetes participant has. You can ask to see the clinic book	1. Type 2 2. Other Types (Type 1, Gestational Diabetes etc) All other types of Diabetes are not eligible for study
1.2	Gender/Sex	1. Male 2. Female
1.3	How old are you? Age in years	
1.4	What is the highest level of education you have attained?	1. Never went to school 2. Completed some Primary Education 3. Completed all of Primary Education 4.Completed some Secondary education 5. Secondary Education (O level certificates) 6. Secondary Education (A level certificate) 7. Vocational Qualification 8. Undergraduate University Degree 9. Post graduate Degree (Msc, Phd))

1.5	How long have you known that you have diabetes? Years past since diagnosis	
1.6 1.6.1	Have you ever received education on how to eat when you have diabetes from any health care institution? If yes to 1.6, please state where you received above mentioned education	1. Yes 2. No 3. Do not know Government..... Private.....
1.7	Have you ever consulted a dietician/nutritionist about the kinds of foods to eat to control your blood sugars? A dietician is a person with a qualification in nutrition- who is able to advise in you detail about your eating patterns for control of blood glucose	1. Yes 2. No 3. Do not know
1.8	Have you ever been taught by a diabetes educator about how to manage your diabetes at home? These are health care professionals who specialize in teaching people with diabetes how to achieve good control of diabetes through knowledge and behaviour change.	1.Yes 2. No 3. Do not know
1.9	Where do you get most of information on the nutritional management of diabetes Tick One most appropriate answer	1. Doctor 2. Nurse 3. Dietitian 4. Media (Radio, TV, News-paper) 5. Other health care workers, please specify ..... 6. Internet 7. Non health care professional, please specify ..... 8. Never got information
1.10	Do you take medication for the management of diabetes?	1. Yes 2. No 3. Do not know
1.11	If answered YES to question 1.9 what type of medication do you use? Those on insulin should answer question 2.10-2.11	1. Oral Medication 2. Insulin 3. Both Oral Medication and insulin

PART B: KNOWLEDGE COMPONENT

In this part of the survey, you will be asked questions which aim to find out what you know about self management of diabetes. These questions will focus on how much you know about the principles of a diet for the prevention and management of diabetes. The questions and the potential responses will be read out to you. Please pick what you think is the most correct response.

2.1	Which of the following strategies can help in preventing diabetes 2.1.1 Weight Loss if overweight 2.1.2 Eating Less sugar 2.1.3 Exercising regularly	 1. Yes B. No C. Don't Know 2. Yes B. No C. Don't Know 3. Yes B. No C. Don't Know
2.2	How should a healthy meal look like on a plate? Use pictures to show patients; ask patients identify what the plate model should look like	1. Filling your plate with ¼ starch ¼ meat, ½ vegetables 2. Filling your plate with ½ starch, ¼ meat and ¼ vegetables 3.Filling your plate with ½ meat, ¼ starch and ¼ vegetables 4. Filling your plate with no starch, ½ meat, ½ vegetables 5. Don't know
2.3	Which of the following foods will raise blood sugar the most	1. Sadza 2. Fish 3. Cooking oil 4. Salt 5. Don't know
2.4	Eating more Unrefined/wholegrains such as sadza rezviyo, mhunga, brown bread and rice helps to control blood sugar levels?	1. Yes 2. No 3. Don't know
2.5	Which of the following is highest in starch? Show example of carbohydrates if participant does not understand	1. Chicken 2. Peanut butter 3. Potatoes 4. Rape 5. Don't know
2.6	Which of the following is highest in fat?	1. Milk 2. Orange juice 3. Maize 4. Honey 5. Don't know
2.7	Which of the following foods can be eaten to treat low blood sugar	1. Three sweets/candy 2. One piece of meat 3. One cup diet soft drink (e.g. Coke 0, diet

		drinks/light) 4. Four slices of cucumber 5. Don't know
2.8	For a person with good control, what effect does exercise have on blood sugar?	1. Lowers it 2. Raises it 3. Has no effect 4. Don't know
2.9	Eating foods lower in fat decreases your risk for?	1. Lung disease 2. Kidney disease 3. Heart disease 4. Eye disease 5. Don't know
	For insulin users only	
2.10	Low blood glucose may be caused by:	1. Too much insulin 2. Too little insulin 3. Too much food 4. Too little exercise 5. Don't know
2.11	If you take your morning insulin but skip breakfast your blood sugar level will usually;	1. Increase 2. Decrease 3. Remain the same 5. Don't know

PART C: ATTITUDE COMPONENT

This part of the survey will ask what you to express an opinion on certain statements made about diabetes treatment (which includes medication, diet and exercise). Statements that some people may say will be read out to you. You need to indicate how much you agree or disagree with the statement.

	(circle one answer for each question)	
3.1	I think it is important for me to Keep my blood sugar in good control	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
3.2	I DO NOT think that being overweight can make it harder for me to control my blood sugars	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
3.3	My health depends on taking my diabetes medication	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
3.4	Regular exercise IS NOT an important part of keeping good	1. Strongly disagree 2. Disagree 3. Neutral

	control of my blood sugars	4. Agree 5. Strongly agree
3.5	Following a prescribed diet can help to keep my sugars under control	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
3.6	I feel have the skills necessary to keep my blood sugar in control	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
3.7	I find it difficult to follow a prescribed diet that helps control my blood sugars	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
3.8	Diet is just as important as medication in controlling blood sugar	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
3.9	Traditional/herbal medicines are more effective than medicines prescribed by doctors in treating Diabetes	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
My diabetes and its treatment keeps me from		
3.10	Being as active as I want	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
3.11	Eating the foods that I like	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
3.12	Eating as much as I like	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
3.13	In general I believe that most people can enjoy life and still keep tight blood sugar control	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

PART D: PRACTICES COMPONENT

This part will assess how often you do certain things relating to your diet, exercise and medication in order to control your blood sugars.

4.1	Have you ever received a diet sheet or written information which includes an eating plan on diabetes?	1. Yes 2. No 3. Don't know
4.2	On average how many days of this week, have you followed your eating plan? i.e. used a diet sheet or advice from a health care professional to plan your meals	0 1 2 3 4 5 6 7 days this week
4.3	Has a health care professional ever told you to control the portions of food you eat?	1. Yes 2. No 3. Don't know
4.4	How many days in the past seven days have you controlled your portions of starch by measuring how much you eat at meals Measurement can be fistfuls/cups/experience based etc	0 1 2 3 4 5 6 7 days of the week
4.5	How many days in the past seven days have you eaten unrefined whole grains (e.g. brown sadza, (re zviyo/mhunga) rice, bread)	0 1 2 3 4 5 6 7 days of this week
4.6	How many days in the past seven days have you 4.6.1 Eaten at least 2 fruits in a day 4.6.2 Eaten vegetables at least 3 times in a day	 0 1 2 3 4 5 6 7 days of this week 0 1 2 3 4 5 6 7 days of this week
4.7	On how many days of the past seven days did you participate in at least 30 minutes of Physical Activity (emphasis on the total minutes of continuous activity) Give examples such as walking, house chores, work related activities	0 1 2 3 4 5 6 7 days of this week
4.8	On how many of the last SEVEN days did you participate in a specific exercise sessions (such as walking, running, playing sport) other than what you do around the house or as part of your work?	0 1 2 3 4 5 6 7 days of this week

4.9	How often do you check your blood sugars	1. Never 2. At least once every 3 months 3. At least once every month 4. At least once a week 5. At least once a day 6. Other .....
4.10	How often do you forget to take medication or insulin	1. Never 2. At least once every 3 months 3. At least once every month 4. At least once a week 5. At least once a day 6. Other .....
4.11	How often do you use traditional medicines and herbal supplements to manage your diabetes	1. Never 2. At least once every 3 months 3. At least once a monthly 4. At least once weekly 5. At least once a day 6. Other .....

Any comments

Ask respondents to comment on reasons for poor attitudes or practices if observed.
Prompt them to make any comments about the diabetes education they have received at clinic

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.....

.....

.....

Thank you for your time!

Completed By..... Signature.....

Checked By..... Signature.....

Date.....

APPENDIX 2: Nutrition focused diabetes self-management education questionnaire-Shona

Nhamba dzapihwa munhu apinda muongororo

Clinic.....

Zuva

Gwaro remibvunzo inotarisa ruzivo, maonero pamwe chete nemaitiro evarwere veshuga pamusoro pekuzvirapa nekuzvichengetedza, takanyanyonangana nekudya kwakanana kunovaka muviri.

CHINANGWA

Ongororo ino yakagadzirwa nechinangwa chekuti tiunganidze umboo pamusoro peruzivo, maonero pamwe chete nemaitiro evanhu vanorarama nechirwere cheshuga cheType 2, zvine chekuita nekuzvirapa pamwe chete nekuzvichengetedza paurwere hwavo. Muchaverengerwa mibvunzo iyi nemutauro wamunoda imi. Pane zvikamu zvina, pamuchbvunzwa zvakasiyana siyana. Ongororo ino ingangotora nguva ingasvika maminetsi makumi maviri kusvika kumakumi matatu kuti mupindure mibvunzo yose.

CHIKAMU A: RUZIVO MAERERENO NEMI

Chikamu yekutanga ndechekuwana ruzivo ruri maerarano nemi. Machakumbirwa kuti musarudze mhinduro chaiyo inonangana nemi.

1.1	Mune mhando (type ye diabetes) kana chiwere cheshuga	1. Type 2 2. Amwe ma mhando/type (Type 1, GDM) Ongororo ino irikuda vanhu vakabatwa type 2 diabetes chete. (ask to check clinic book, if participant is unsure)
1.2	Munhurume/munhukadzi	1. Murume 2. Mukadzi
1.3	Mune makore mangani?	
1.4	Makadzidza kusvika padano ripi?	1.Handina kumbobvira ndaenda kuchikoro 2. Handina kupedza puraimari/Handina kusvika pa grade 7 3.Ndakapedza puraimari/grade 7 kana 'kupasa' grade 7 4.Handina 'kupasa' fomu 4/ kana handina ma O levels akakwana

		5.Ndine ma O levels angu akakwana/ kana setifiketi refomu 4 6. Ndine maA levels angu akakwana/ kana sertifiketi re fomu 6 7. Ndakasvika kukoreji 8. Dhigirii rekutanga repayunivhesiti 9.Dhigirii repamusoro rekuyunivhesiti (Msc, PhD)
1.5	Mave nenguva yakareba zvakadini kubva pamakaziva kuti mune chirwere cheshuga?	
1.6 1.6.1	Makambodzidziswawo here pachipatara kana pakiriniki pamusoro pekuti munodya sei kana muchirwara nechirwere cheshuga? Kana mhinduro yenyu iri hongu, mungandiudzewo here kuti makadzidziswa kupi?	1. Hongu 2. Kwete 3. Handizive Private kiriniki/chipatara..... Pakiriniki/chipatarache Hurumende……
1.7	Pane zvamakabo dzidziswa here pamusoro pe madyiro anfonaira kuitwa nemhunu ane chiwere che suga (kana diabetes) ne mushandi we utano anoita basa rakananganana nezvekudya kwakanaka kunovaka muviri (*dietician kana nutritionist*)? Dietician kana nutritionist mashundi we utano anoita basa rekudzidzisa pamusoro pechikafu kunovaka muviri kana kuti ma 'diet' anobatsira nezviwere zvaka siyana siyana.	1. Hongu 2. Kwete 3. Handizive
1.8	Pane zvamakabo dzidziswa here pamusoro pekuchengetedza suga yenyu iripakanaka ne mushandi we utano (mukoti kana chiremba etc) ane ruzivo uri pamusoro nekukudzidzisa vanhu vabatwa chewere cheshuga pakuzvichengetedza? (Diabetes educator) Mudzidzisi we chiwere cheshuga anogona kuita mukoti, chiremba kana mumwe mushandi we utano.	1. Hongu 2. Kwete 3. Handizive
1.9	Munowana kupi rumwe ruzivo pamusoro pemadyiro anobatsira kuzvichengetedza pachirwere cheshuga?	1. Kwachiremba 2. Kwamukoti 3. Mushandi anoona nezvekudya kwakanaka kunovaka muviri (*dietician*) 4. Muredhiyo, terevhizheni kana nyuzipepa

		5. Vamwewo vashandi vezveutano, Tsanangurai ……. 6. Vamwewo vashandi vasinei nezveutano, Tsanangurai ……. 7. Pa-internet/kana computer 8. Handina kumbobvira ndawana ruzivo pamusoro pechikafu inofanira kudyiwa pachiwere cheshuga
1.10	Munonwa mapiritsi kana mimwe mishonga yeshuga here?	1.Hongu 2.Kwete 3.Handizive
1.11	Kana mhinduro yenyu iri hongu pamubvunzo wabvunzwa pa 1.10, Munoshandisa mushonga ipi?	1. Mapiritsi ekuderedza shuga mumuviri 2. Insulin 3. Mapiritsi ekuderedza shuga ne Insulin Vanoshandisa Insulin vanofana kupindura mibvunzo 2.11-2.12

CHIKAMU B. RUZIVO RWENYU

Chikamu chechipiri chichaongorora ruzivo rwenyu pamusoro pechirongwa chekuzvichengetedza nekuzvirapa takanyanyonangana nekudya kwakanaka kunovaka muviri. Muchakumbirwa kuti musarudze mhinduro chaiyo (zvichireva kuti mhinduro yakakodzera) kubva pane mhinduro dzakasiyana-siyana dzamuchaverengerwa.

2.1	Inzira dzipi dzinoshandiswa pakudzivirira kuti musabatwe nechirwere cheshuga? 2.1.1 Unofanira kuona kuti hausimbi zvakapfurikidza mwero 2.2.2 Unofanira kuderedza uwandu hweshuga yaunodya 2.2.3 Kuita maekisesaizi nguva nenguva	 1. Hongu 2.Kwete 3. Handizive 1. Hongu 2.Kwete 3. Handizive 1. Hongu 2.Kwete 3. Handizive
2.2	Ndi tsanangurirei kuti pakudya chikafu, munofanira kudya chakawanda sei *Use pictures to show patients; ask patients identify what the plate model should look like*	1.Ndinofanira kuwanza muriwo, (1/2 ye ndiro) ma starch ne nyema anofanira kuita mashoma (¼ nyama, ¼ ma starch) 2. Ndinofanira kuwanza ma starch (1/2 ye ndiro),

	Ma starch ichakufu chakaita se rice, chingwa ne sadza.	nyama ne muriwo anofanira kuita mashoma (1/4 nyama, ¼ muriwo) 3.Ndinofanira kuwanza nyama, (1/2 ye ndiro) muriwo ne ma starch anofanira kuita mashoma (1/4 ma starch, ¼ muriwo) 4.Ndinofanira kusadya ma starch zvachose, ndowanza muriwo(½ ye ndiro) ne nyama (½ ye ndiro)
2.3	Ndekupi kudya kunonyanyokwidza shuga mumuviri kubva pane zvinotevera?	1. Sadza 2. Hove 3. Mafuta ekubikisa 4. Sauti (munyu)
2.4	Kunynanya kudya chikafu chakaite se sadza re zviyo/mhunga, rice re brown zvinobatsira here kuti suga igare pakanaka	1. Yongu 2. Kweti 3. Handizive
2.5	Ndekupi kudya kunopa simba (carbohydrate/starch) mumuviri kubva pane zvinotevera?	1. Nyama yehuku 2. Dovi 3. Mbatatisi 4. Rape
2.6	Ndekupi kudya kune mafuta akawanda kubva pane zvinotevera?	1. Mukaka 2. Dhiringi reorenji 3. Chibage 4. Huchi
2.7	Chii chinga shandiswa pakurapa shuga yakaderera muropa	1. Ma siwiti matatu 2. Ka piece ke nyama 3. kapu imwe chete yedhiringi isina shuga (e.g. Coke Zero, Light coke) 4. ma slice matatu emaghaka
2.8	Kumunhu anenge achigona kudzikamisa shuga yemumuviri make, kuita maekisesaizi kunobatsirei pashuga yemuropa?	1. Anoideredza 2. Anoikwidza 3. Haana chaanoita
2.9	Kudya zvokudya zvine mafuta mashoma kunoderedza mikana yekuva panjodzi yekubata zvirwere zvinotevera:	1. Chirwere chemapapu 2. Chirwere cheitsvo 3. Chirwere chemoyo 4. Chirwere chemaziso
Zvevarwere vanoshandisa mushonga weInsulin chete		
2.11	Kuderera kweshuga yemuropa kunokonzerwa ne:	1. Insulin yakawandisa 2. Insulin yakaderera 3. Zvekudya zvakawandisa 4. Maekisesaizi mashoma
2.12	Ukazvibaya ne insulin yako	1. Inowedzera

	yemangwanani wobva warega kudya kudya kwemangwanani, shuga yemuropa mako inowanzoita sei?:	2. Inoderera 3. Inongoramba iri zvayanga yakaita

CHIKAMU C: MAONERO

Chikamu chechitatu chichatarisa maonero enyu nezve kukosha kwe mushonga, chikafu nezvimwe pakuzvichengetedza nechiwere che shuga.

	Komberedza mhinduro imwe chete pamutsetse mumwe nemumwe	
3.1	Ndinofunga kuti zvakakosha kugara shuga yemuropa mangu iri pakanaka	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya
3.2	Handifunge kuti zvakosha kuti ndi chengetedza muviri wangu uri pakanaka (handifanirwi kutarisa kusimbisa kana kuondesa kwangu) pakuchengetedza pachiwere changu chesuga	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya
3.3	Utano hwangu hunobva pakushandisa kwangu mishonga yechirwere cheshuga	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya
3.4	Kuita maekisesaizi (akafanana nekufamba, mhanya kana zvimwewo) hazvibatsire pakuzvichengetedza pachirwere changu che shuga	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya
3.5	Kutevedzera kudya kwandinenge ndaudzwa nemushandi wehutano kunobatsira pakuzvichengetedza pachirwere changu che shuga	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya
3.6	Ndinoona sekuti ndine ruzivo runodiwa Kuchengetedza shuga yemuropa rangu iri pakanaka	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya

3.7	Ndinonetsekana neku tevedzera madyiro anofanira kuitwa nemunhu ane chirwere che shuga.	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya
3.8	Kudya kune utano kwakakosha semakoshero akaitawo mishonga pakudzikamisa shuga yemuropa	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya
3.9	Mishonga yechivanhu/midzi inoshanda zvakanyanya kudarika mishonga yaanachiremba pakurapa chirwere cheshuga	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya
	Chirwere changu cheshuga pamwe chete nekurapwa kwacho ndizvo zvinondidzivisa kuita zvinotevera	
3.10	Kumhanya-mhanya sezvandingada	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya
3.11	Kudya zvokudya zvandinoda	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya
3.12	Kudya zvokudya zvakawanda sezvandingada	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya
3.13	Semaonero angu ndinotendera kuti vanhu vakawanda vanofadzwa neupenyu hwavo uye vanokwanisa kuchengetedza shuga yemuropa mavo iri pakanaka	1. Handibvumirani nazvo zvachose 2. Handibvumirani nazvo 3. Handina chokwadi 4. Ndinobvumirana nazvo 5. Ndinobvumirana nazvo zvakanyanya

CHIKAMU D: MAITIRO

Chikamu chechina chichazotarisa maitiro amunoita pakuvandudza kuzvirapa nekuzvichengetedza paurwere hwenyu. Muchakumbirwa kuti musarudze mhinduro chaiyo inonangana nemi

4.1	Mune pamakanyorerwa here chikafu chamunofanirwa kudya se mhunhu ane chirwere che suga	1.Hongu 2. Kwete 3. Handizive
4.2	Ndo madyiro amunoita ma zuva ose here kana munoti apo ne apo. Kanagani panumontevedzera pa vhiki.	*0 1 2 3 4 5 6 7 zuva pa vhiki*
4.3	Makamboudzwawo here ne mushandi weutano kuti munofanria kudya zvakawanda sei semunhu ane chiwere che suga	1. Hongu 2. Kwete 3. Handizive
4.4	Mazuva mangani Muvhiki yafura amakatedzera madyiro amunofanira kuita ma starch. (chikafu chinopa simba) *i.e. kutarisa uhwandi we mastarch nekushandasi ma kapu kana kuenzana nechibakera*	*0 1 2 3 4 5 6 7 zuva pa vhiki*
4.5	Mazuva mangani Muvhiki yafura amakadya zvakaita se sadza re zviyo, mhunga, rice ye brown kana chingwa ye brown.	*0 1 2 3 4 5 6 7 zuva pa vhiki*
4.6	Mazuva mangani Muvhiki yafura amakatedzera: 4.6.1 Kudya michero maviri kana kufura maviri pa zuva 4.6.2 Kudya muriwo katatu pazuva kana kufura pa zuva	 *0 1 2 3 4 5 6 7 zuva pa vhiki* *0 1 2 3 4 5 6 7 zuva pa vhiki*
4.7	Mazuva mangani Muvhiki yafura amakatedzera kuita ma exesaizi anofura maminiti makuma matatu (30 minutes) e.g. kumhanya, kufamba, kuita mabasa etc	*0 1 2 3 4 5 6 7 zuva pa vhiki*
4.8	Mazuva mangani Muvhiki yafura amakatedzera kuita ma exesaizi akafanana nekufamba, mhanya kana nhabvu (kutamba ma sports) zvisiri mabasa amanoita	*0 1 2 3 4 5 6 7 zuva pa vhiki*

	(e.g. mabasa emumba, kubasa, kana kufamba kubasa)	
4.9	Munotarisa shuga yemuropa menyu kakawanda zvakadini?	1. Handina kumbobvira ndazvitevedzera 2. Kamwechete pamwedzi matatu afura 3. Kamwechete pamwedzi 4. Kamwechete pavhiki 5. Kamwechete pazuva 6.Imwe Dairo .....
4.10	Munokanganwa kunwa mishonga yenyu kana insulin kakawanda zvakadini?	1. Handi kanganwi 2. Kamachwete pamwedzi matatu afura 3. Kamwechete pamwedzi 4. Kamwechete pavhiki 5. Kamwechete pazuva 6.Imwe Dairo ,,,

APPENDIX 3: Health profession primary care and resources and support for chronic disease self-management education (PCRS) PDF document

Assessment of Primary Care Resources and Supports for Chronic Disease Self Management (PCRS)[1,2,3]

Individuals interested in using the PCRS in quality improvement work or research are free to do so. We request that you not change the wording or content of the questions and that attribution to the Robert Wood Johnson Foundation *Diabetes Initiative* appears prominently on all pages. We would appreciate an e-mail or phone call from users of the tool, so we can track its dissemination. We also ask that users be willing to share results and feedback about the instrument with us so that we can continually update our work. If you need written documentation from us verifying permission to use the PCRS, please contact:

Robert Wood Johnson Foundation *Diabetes Initiative* National Program Office
Washington University in St. Louis School of Medicine
Division of Health Behavior Research
4444 Forest Park Avenue Suite 6700
St. Louis, MO 631082212
Phone: 314-286-1900
E-mail: diabetes@dom.wustl.edu http://diabetesinitiative.org

[1] http://diabetesinitiative.org/lessons/tools.html

[2] Brownson CA, Miller D, Crespo R, Neuner S, Thompson JC, Wall JC, Emont S, Fazzone P, Fisher EB, Glasgow RE. Development and Use of a Quality

[2]Improvement Tool to Assess Self-Management Support in Primary Care. *Joint Commission Journal on Quality and Patient Safety*. 2007 Jul;33(7):408-16.

[3] Shetty G, Brownson CA. Characteristics of Organizational Resources and Supports for Self Management in Primary Care. *The Diabetes Educator*. 2007Jun;33(Suppl 6):185S-192S

Developed March 2006 by the *Diabetes Initiative* with support from the Robert Wood Johnson Foundation® in Princeton, New Jersey. Revised December 2008.

Assessment of Primary Care Resources and Supports for Chronic Disease Self Management (PCRS)

Background and User Guide

Purpose

This survey was developed by the Advancing Diabetes Self Management (ADSM) Program of the Robert Wood Johnson Foundation *Diabetes Initiative*. The ADSM grantees wanted an instrument that would further delineate and facilitate assessment of the self- management component of the Chronic Care Model. The purpose of the PCRS is to help primary care settings focus on actions that can be taken to support self management by patients with diabetes and/ or other chronic conditions. Specific goals are that it:

1. Function as a self-assessment, feedback and quality improvement tool
2 Characterize optimal performance of providers and systems as well as gaps in resources, services and supports
3. Promote discussion among patient care team members that can help build consensus for change and plans for improvement
4. Give teams a way to measure progress over time.

Who should use this tool?

This tool was developed for primary health care settings interested in improving self-management support systems and service delivery. It is to be used with multi-disciplinary teams (e.g. physicians, mid-level practitioners, nurses, educators, medical assistants, behavioral health specialists, social workers, dieticians, community health workers or others) that work together to manage patients' health care. We suggest that teams use it periodically (e.g., quarterly, semi-annually) as a way to monitor their progress and guide the integration of self-management supports into their system of health care.

Why another assessment tool?

The PCRS can be used along with other tools such as the Assessment of Chronic Illness Care (ACIC).[4] While it is consistent with and complementary to the ACIC, the PCRS focuses exclusively and more comprehensively on self-management support. Using the PCRS to initiate quality improvement processes should lead to improved patient and staff competence in self-management processes and improved behavioral and clinical outcomes among patients.

[4] Bonomi AE, Wagner EH, Glasgow RE, VanKorff R. Assessment of chronic illness care (ACIC): a practical tool to measure quality improvement. *Health Services Research.* 2002 Jun;37(3):791-820.

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Assessment of Primary Care Resources and Supports for Chronic Disease Self Management (PCRS)

How is the PCRS organized?

This survey tool consists of 16 characteristics of self-management support that are separated into two categories: patient support and organizational support. (Definitions provided in the Appendix). Below the characteristic name are descriptions of four levels of performance from lowest on the left (D) to highest on the right (A).

- D is the lowest level; it is an indication of inadequate non-existent activity.
- C pertains to the patient-provider level. At this level, implementation is sporadic or inconsistent; patient-provider interaction is passive.
- B pertains to the team level. At this level, implementation is done in an organized and consistent manner using a team approach; services are coordinated.
- A is the highest level; it assumes the B level plus system-wide adoption and integration of that aspect of self-management support.

With the exception of level D, each level has three numbers from which to select. This allows team members to consider to what degree their team is meeting the criteria described for that level; that is, how much of the criteria and/ or how consistently their team meets this criteria.

Completing the PCRS:

- Each member of the team fills out the assessment independently, reflecting a specified period of care delivery (e.g., last quarter) for a specific group of patients (e.g., those with specific condition, those seen by certain patient care teams, etc.).

Using the 1 – 10 scale provided, respondents circle one numeric rating for each of the 16 characteristics.

There are no right or wrong answers; scores are based on individuals' knowledge, experience and observation of how well the team is addressing the characteristic shown.

- When finished, team members may transfer their numeric answers onto the score sheet at the end of the survey. The score sheet can be returned to the person coordinating the assessment so scores can be compiled for team review and discussion.

Using the results:

- When all members have completed the tool, it is recommended that the team meet to share comments, insights and rationale for scores. To facilitate the discussion, the person coordinating the assessment may want to prepare a summary list of the results so that team members can easily see the range of scores on each item, the average score for each item or other helpful information. (Note: if the assessments are being filled out during a team meeting, results can be recorded in real time as part of the discussion.).

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Discussion should NOT be focused on “right” or “wrong”, but rather why various ratings were given. The value of this tool is not in the number each member assigns, but in the improvement process that is initiated by discovery of discrepancies or gaps in
capacity. Discrepancies in scores offer an important opportunity for discussion that can lead to improved communication and team function.

- Based on the discussion and consensus among members, teams may chose to develop quality improvement plans in one or more areas of self-management support.
- Using the PCRS periodically gives teams a way to measure the impact of their improvement processes and facilitates the integration of self-management supports into their system of care.

Individual Instructions for Completing the PCRS *

We are using this tool, the Assessment of Primary Care Resources and Supports for Chronic Disease Self Management (PCRS), to help us monitor and improve our support for patient self management. Although the survey can be answered regarding any of a number of chronic illness conditions, for today we would like you to rate the care your team provides for your patients only.

Each team member's perspective is unique and valuable. For this reason, please complete the survey independently, before discussing your ratings with other team members.

When considering your responses to each item, use the previous months as the timeframe.

Using the 1 – 10 scale in each row, give one numeric rating for each of the 16 characteristics. Please rate your patient care team on the extent to which it addresses each self-management characteristic for those patients specified above. (Definitions of characteristics are provided in the Appendix following the survey).In general, to warrant a rating in the highest category (8, 9 or

10), that characteristic of self-management support should be consistently and systematically integrated into care in a way that is sustainable.

There are no right or wrong answers. If you are unsure or do not know, please give your best guess, and make notes on the side

(or in the comment section of the score sheet) regarding any thoughts or questions you have about that item.

Transfer your scores to the score sheet and return the score sheet (or a copy of it) to the person coordinating the

assessment, _____ (name), by (date). Please make sure you also complete the

descriptive information in the box at the top of the page.

After all team members have completed their surveys individually, scores will be aggregated and the team will meet to discuss the results. Feel free to bring your completed assessment to the meeting for reference.

If you have any questions, need assistance or clarification, please contact_ (contact info). (name) at

Thank you.

** The team leader or designated assessment coordinator should complete this form and distribute it with the PCRS to team members. The instructions may be tailored as appropriate for your setting.*

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To be filled in by the assessment coordinator:

Site/ Location: **Team:**

Focus of assessment or patient population under consideration (e.g., those with specific condition, those seen by certain patient care teams):

Time period under consideration:

To be completed by respondent: My role in team: **My profession:**

I: PATIENT SUPPORT (circle one NUMBER for each characteristic)				
	Quality Levels			
1. Individualized Assessment of Patient's Self-Management Educational Needs	**…is not done** **1**	**…is not standardized and/ or does not consistently include most self-management components*** **2 3 4**	**…is standardized, fairly comprehensive and documented prior to initial goal setting; takes into account language, literacy and culture; assesses patient's self- management knowledge, behaviors, confidence, barriers, resources, and learning preferences** **5 6 7**	**…is an integral part of planned care for chronic disease patients; results are documented, systematically reassessed and utilized for planning with patients** **8 9 10**
2. Patient Self-Management Education	**…does not occur** **1**	**…occurs sporadically or without tailoring to patient skills, culture, educational needs, learning styles or resources** **2 3 4**	**…plan is developed with patient (and family if appropriate) based on individualized assessment; is documented in patient chart; all team members generally reinforce same key messages** **5 6 7**	**…is documented in patient charts; is an integral part of the care plan for patients with chronic diseases; involves family and community resources; is systematically evaluated for effectiveness** **8 9 10**

I: PATIENT SUPPORT (circle one NUMBER for each characteristic)				
	Quality Levels			
	D	C	B	A (=all of B plus these)
3. Goal Setting/ Action Planning	…is not done 1	…occurs but goals are established primarily by health care team rather than developed collaboratively with patients 2 3 4	…is done collaboratively with all patients/ families and member(s) of their health care team; goals are specific, documented and available to any team member; goals are reviewed and modified periodically 5 6 7	…is an integral part of care for patients with chronic diseases; goals are systematically reassessed and discussed with patients; progress is documented in patient charts 8 9 10
4. Problem- Solving Skills	…are not taught or practiced with patients 1	…are taught and practiced sporadically or used by only a few team members 2 3 4	… are routinely taught and practiced using evidence-based approaches and reinforced by members of the health care team 5 6 7	…. is an integral part of care for people with chronic diseases; takes into account family, community and environmental factors; results are documented and routinely used for planning with patients 8 9 10
5. Emotional Health	…is not assessed 1	…is not routinely assessed; screening and treatment protocols are not standardized or are nonexistent 2 3 4	…assessment is integrated into practice and pathways established for treatment and referral; patients are actively involved in goal setting and treatment choices; team members reinforce consistent goals 5 6 7	…systems are in place to assess, intervene, follow up and monitor patients' progress and coordinate among providers; standardized screening and treatment protocols are used 8 9 10

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I: PATIENT SUPPORT (circle one NUMBER for each characteristic)				
	Quality Levels			
	D	C	B	A (=all of B plus these)
6. Patient Involvement	…does not occur 1	…is passive; clinician or educator directs care with occasional patient input 2 3 4	…is central to decisions about self-management goals and treatment options; is encouraged by health care team and office staff 5 6 7	… is an integral part of the system of care; is explicit to patients; is accomplished through collaboration among patients and team members; takes into account environmental, family, work or community barriers and resources 8 9 10
7. Patient Social Support	…is not addressed 1	…is discussed in general terms, not based on an assessment of patient's individual needs or resources 2 3 4	…is encouraged through collaborative exploration of resources available to meet individual needs (e.g., significant others, education groups, support groups) 5 6 7	… systems are in place to assess needs, link patients with services and follow up on social support plans using household, community, or other resources 8 9 10
8. Linking to Community Resources	…does not occur 1	…is limited to a list or pamphlet of contact information for relevant resources 2 3 4	…occurs through a referral system; team discusses patient needs, barriers and resources before making referral 5 6 7	…systems are in place for coordinated referrals, referral follow-up and communication among practices, resource organizations and patients 8 9 10

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II. ORGANIZATIONAL SUPPORT (Circle one NUMBER for each characteristic)				
	Quality Levels			
	D	C	B	A (=all of B plus these)
1. Continuity of Care	…does not exist 1	…is limited; some patients have an assigned primary care provider (PCP); planned visits and routine lab work occur sporadically 2 3 4	…is achieved through assignment of patients to a PCP or designated primary care team member, scheduling of routine planned visits with appropriate team members, and involvement of most team members in ensuring patients meet care guidelines 5 6 7	…systems are in place to support continuity of care, to assure all patients are assigned to a provider or team member, to schedule planned visits and to track and follow up on all patient visits and labs 8 9 10
2. Coordination of Referrals	…does not exist 1	… is sporadic, lacking systematic follow-up, review or incorporation into the patient's care plan 2 3 4	…occurs through team and office staff working together to document, track and review completed referrals and coordinate with specialists in adjusting the patient's care plan 5 6 7	…is accomplished by having systems in place to track incomplete referrals and follow up with patients and/ or specialists to complete referrals 8 9 10
3. Ongoing Quality Improvement (QI)	… does not exist 1	…is possible because organized data are available, but practice has not initiated specific QI projects in this area 2 3 4	…is accomplished by a patient care team that uses data to identify trends and launches QI projects to achieve measurable goals 5 6 7	… uses a registry, electronic medical record or other system to routinely track key indicators of measurable outcomes; is done through a structured and standardized process with administrative support and accountability to management 8 9 10

Developed March 2006 by the *Diabetes Initiative* with support from the Robert Wood Johnson Foundation® in Princeton, New Jersey. Revised December 2008.

II. ORGANIZATIONAL SUPPORT (Circle one NUMBER for each characteristic)				
Characteristic	Quality Levels			
	D	C	B	A (=all of B plus these)
4. System for Documentation of Self-Management Support Services	…does not exist 1	…is incomplete or does not promote documentation (e.g., no forms in place)	…includes charting or documentation of care plan and self-management goals; is used by the team to guide patient care 5 6 7	… is an integral part of patient medical records; information is easily accessible to all team members and organized to see progression; charting or documentation includes care provided by all care team members and referral specialists
5. Patient Input	… does not occur 1	… mechanisms exist, but are not promoted; input solicited sporadically 2 3 4	…. is solicited through focus groups, surveys, suggestion boxes, or other means for both service and service delivery improvements under consideration; patients are made aware of mechanisms for input and invited or encouraged to participate	…is an essential part of management's decision- making process; systems are in place to ensure consumer input regarding practice policies and service delivery; there is evidence that management acts on the information
6. Integration of Self-Management Support into Primary Care	…. does not exist 1	…is limited to special projects or to select teams 2 3 4	…is routine throughout the practice; team members reinforce consistent strategies 5 6 7	…is built into the practice's strategic plan; is routinely monitored for quality improvement and visibly supported by leadership 8 9 10

II. ORGANIZATIONAL SUPPORT (Circle one NUMBER for each characteristic)				
	Quality Levels			
	D	C	B	A (=all of B plus these)
7. Patient Care Team (internal to the practice)	… does not exist 1	…exists but little cohesiveness among team members 2 3 4	...is well defined; each member has defined roles and responsibilities; there is good communication and cohesiveness among members; members are cross-trained, have complementary skills 5 6 7	...is a concept embraced, supported and rewarded by the senior leadership; "teamness" is part of the system culture; case conferences or team reviews are regularly scheduled 8 9 10
8. Physician, Team and Staff Self-Management Education & Training	… does not occur 1	...occurs on a limited basis without routine follow-up or monitoring 2 3 4	…is provided for some team members using established and standardized curricula; practice assesses and monitors performance 5 6 7	...is supported and incentivized for all key team members; continuing education is routinely provided to maintain knowledge and skills; job descriptions reflect skills and orientation to self management 8 9 10

Site/ Location: **Team:** _____

Focus of assessment or patient population under consideration: **My role on the team:** _____

My profession: _____ **Date:** _____

Summary Score Sheet

Please transfer the rating (1-10) that you gave each characteristic onto this sheet. The person who coordinated the assessment may ask for a copy of this sheet or your survey so that team results can be aggregated and presented for discussion at a team meeting.

I. Patient Support……Score (number selected)	**II. Organizational Support……Score (number selected)**
1. **Individualized assessment……**	1. **Continuity of care……**
2. **Self-management education……**	2. **Coordination of referrals……**
3. **Goal setting/ action planning……**	3. **Ongoing quality improvement ……**
4. **Problem-solving skills ……**	4. **Systems for documentation of SMS**
5. **Emotional health……**	5. **Patient input……_**
6. **Patient involvement ……**	6. **Integration of SMS into primary care**
7. **Patient social support ……**	7. **Patient care team……**
8. **Link to community resources……**	8. **Education and training……**
Total Score……	**Total Score……**

Comments: (use reverse side if needed and/or write comments directly on the survey and provide a copy to the assessment coordinator)

Developed March 2006 by the *Diabetes Initiative* with support from the Robert Wood Johnson Foundation® in Princeton, New Jersey. Revised December 2008.

Definitions of self-management support characteristics in the PCRS

PATIENT SUPPORT

1. Individualized assessment of patient's self-management educational needs: The process of determining patient-specific educational needs, barriers, skills, preferences, learning styles and resources for self management.

2. Self-management education: An interactive, collaborative and ongoing process of providing information and instruction to support people's ability to successfully manage their health condition, their daily life activities, and the emotional changes that often accompany having a chronic condition.

3. Collaborative goal setting: The process of providers and patients working together on identifying something the patient wants to accomplish and agreeing on a plan for getting started. Well formulated goals are "SMART" (Specific, Measurable, Action-oriented, Realistic, and Time-limited).

4. Problem solving skills: Skills patients can learn and use to overcome barriers to healthy self management. The process involves a series of steps: identifying the problem or barrier, identifying possible solutions, selecting and implementing the one that seems best, evaluating the results, and planning next steps accordingly.

5. Emotional health: Mental or emotional health generally refers to an individual's thoughts, feelings and moods. Good mental health is defined in the Surgeon General's report as "the successful performance of mental function, resulting in productive activities, fulfilling relationships with other people, and the ability to adapt to change and cope with adversity." Difficult emotions, on the other hand, run the gamut from stress and anxiety to depression and psychopathology and can be a barrier to healthy self management.

6. Patient involvement in decision making: Patient involvement means that patients--and their families--are involved in planning and making decisions about the patient's health care. In this approach, patients are viewed as key members of the health care team and have access to useful information to promote health and manage disease. Patient involvement implies shared decision making about care and ensuring that the patient's values guide all clinical decisions.

7. Patient social support: The assistance or help that is accessible to a patient through their social ties to others including family, friends, neighbors and peers. Social support can take many forms such as emotional support, tangible assistance, information or helpful feedback.

8. Link to community resources: Community resources include programs, services, and environmental features that support self- management behaviors. Programs and services that support self management may be available through community agencies, schools,faith-based organizations or places of work. Examples of environmental supports include safe, accessible and affordable places for physical activity and for buying healthy food.

ORGANIZATIONAL SUPPORT

1. Continuity of Care: The coordination and smooth progression of a patient's care over time and across disciplines. Continuity of care is supported by systems that use a team approach to care, schedule planned visits and follow up on visits and lab work.

2. Coordination of referrals: Effective collaboration and communication among primary care providers and specialists. Coordination of referrals is supported by systems that track referrals, monitor incomplete referrals, and ensure follow-up with patients and/or the specialists to complete referrals.

3.Ongoing Quality Improvement: The process of using data on a regular basis to identify trends, undertake processes to improve aspects of service delivery, and measure the results. Patient care teams often use the Plan, Do, Study, Act (PDSA) rapid cycle improvement process to facilitate the improvement process.

4. System for Documentation of Self-Management Support Services: Standardized processes used by members of the patient care team to record patient self-management goals and progress notes into patient charts (or electronic medical records) and routinely monitor their progress.

5. Patient Input: The ideas, suggestions and feedback from patients about the services and quality of care provided by your team or health care setting. This occurs when there are systems or procedures in place to solicit input thought such mechanisms as focus groups, surveys, suggestion boxes, or patient advisory committees.

6 Integration of Self-Management Support into Primary Care: Integration occurs when self-management support is a fundamental and routine part of all chronic illness care.

7.Patient Care Team: A patient care team is a multidisciplinary group (e.g. physicians, mid-level practitioners, nurses, educators, medical assistants, behavioral health specialists, social workers, dieticians, community health workers or others) that works together to manage a patient's health care.

8.Physician, Team and Staff Self-Management Education & Training: Opportunities for members of the patient care team to increase their knowledge and improve skills and practices for improving self-management support. Health care systems can support continuing education and training by setting an expectation for excellence, offering training to all team members, ensuring that new team members have access to orientation and training, assessing and monitoring performance and providing incentives for the adoption of new practices and skills.

APPENDIX 4: Patients informed consent form – English

INFORMED CONSENT FORM

Assessing the Extent and Effectiveness of Diabetes self-management in public Health-care Institutions in Harare Zimbabwe

Principal Investigator: Sanele Nkomani R.D (Zim)

Phone number(s):0776 592 141

WHAT YOU SHOULD KNOW ABOUT THIS RESEARCH STUDY:

We give you this consent so that you may read about the purpose, risks, and benefits of this research study.
Routine care is based upon the best known treatment and is provided with the main goal of helping the individual patient. The main goal of research studies is to gain knowledge that may help future patients.
We cannot promise that this research will benefit you.
You have the right to refuse to take part, or agree to take part now and change your mind later.
Whatever you decide, it will not affect your regular care.
Please review this consent form carefully. Ask any questions before you make a decision.
Your participation is voluntary.

PURPOSE

You are being invited to participate in a research study assessing your knowledge, attitudes and practices about type 2 diabetes through a questionnaire which will be read to you. The purpose of this study is assess the extent and effectiveness of Diabetes self-management Education with a specific focus on Nutrition and lifestyle interventions in improving the knowledge, attitudes and practices of adult Type 2 diabetics in clinics in Harare, Zimbabwe. The importance of standardized Diabetes self-management education programs in improving knowledge and skills of patients has long been established. Effective diabetes education programmes have been shown to have a positive effect on patient blood glucose control. It is therefore necessary for health care workers to continuously evaluate how effective current diabetes education programs are in improving patient knowledge, attitudes and practices. This study will assess knowledge, attitudes and practices of Diabetic Patients through a questionnaire in order to identify the strengths and weaknesses of current diabetes education programs.

You were selected as a possible participant in this study because you are an adult with Type 2 Diabetes Mellitus who receives treatment at one of the selected facilities. Approximately 140 participants will be selected from various health care centres in Harare which include Parirenytwa Hospital, Harare Hospital Diabetes Outpatient clinics and City Health Clinics.

The following are the facilities that were selected for inclusion in the study:

1. Parirenyatwa out-patient dept Diabetes clinic
2. Harare Hospital out-patient dept Diabetes clinic
3. Borrowdale Clinic
4. Highlands Primary Care Clinic
5. Mbare Poly-clinic
6. Highfields Poly-clinic
7. Glen View Poly-clinic
8. Rujeko Poly-clinic

PROCEDURES AND DURATION

You will be asked to read this consent form on your own or with the field worker. After reading and understanding, If you decide to participate in the study you will be asked to print your name and sign this consent form as proof of your agreement. Then you will be asked to answer questions about your knowledge, attitudes and practices with regard to the management of diabetes. The questionnaire will take about 20-25 minutes to complete. No further involvement will be required from you. It is your responsibility to answer all questions honestly and to the best of your ability. Each questionnaire will be assigned a number for identification so that your name is not on the questionnaire.

RISKS AND DISCOMFORTS

There are no reasonably foreseeable risks and discomforts associated with taking part in this study beyond the potential inconvenience of having to spend an extra +/- 20-25 minutes at your routine clinic visit to complete the questionnaire.

BENEFITS AND/OR COMPENSATION

There is no direct personal benefit from your participation in the study, however the knowledge received from you will be invaluable to health care workers in diabetes care. This knowledge may benefit you in the future as education programs may be developed to suit your needs based on the assessment of your knowledge, attitudes and practices with regard to diabetes.

You will not receive any compensation for agreeing to participate in this study.

CONFIDENTIALITY

Any information that is obtained in connection with this study that can be identified with you will remain confidential and will be disclosed only with your permission. Your name is the only personal information that will be recorded at the end of this consent form. The questionnaire will not have your name on it. Study data will be kept in a secure location. Your questionnaire and consent form will be kept in separate locations such that your questionnaire always remains anonymous. The principle researcher is the only person who will have access to study data. By agreeing to participate in this study, you understand and agree that data and information gathered through the study may be used by the principle investigator in publications. However your name or any other piece of information that can reveal your identity will not be mentioned

in the dissemination of results nor will it be mentioned in publications. Under some circumstances, the MRCZ and other ethics boards may need to review information obtained from you through the questionnaire for compliance audits.

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you decide not to participate in this study, your decision will not affect the quality of care you receive from any health care facility. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any point in the process without penalty.

ADDITIONAL ELEMENTS

The Study will be carried out according to the Declaration of Helsinki and the International Council of Human Rights and Medical Research Council Guidelines.

OFFER TO ANSWER QUESTIONS

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over.

AUTHORIZATION

You are making a decision whether or not to participate in this study. Your signature indicates that you have read and understood the information provided above, have had all your questions answered, and have decided to participate.

_____ _____

Name of Research Participant (please print) Date

_____ _____

Signature of Participant or legally authorized representative Time

_____ _____

Signature of Witness Signature of Staff Obtaining Consent

YOU WILL BE GIVEN A COPY OF THIS CONSENT FORM TO KEEP.

If you have any questions concerning this study or consent form beyond those answered by the investigator, including questions about the research, your rights as a

research participant or research-related injuries; or if you feel that you have been treated unfairly and would like to talk to someone other than a member of the research team, please feel free to contact the Medical Research Council of Zimbabwe on telephone 791792 or 791193.

Physical Address of MRCZ:

Cnr Josiah Tongogara / Mazowe Street, Harare, Zimbabwe

APPENDIX 5: Patient informed consent form – Shona

GWARO ROKUPA MVUMO

Kuongorora mwero pamwe chete nemashandiro anoita chirongwa chekuzvirapa chirerwe cheshuga muzvipatara zvehurumende muHarare Zimbabwe

Muongorori Mukuru: Sanele Nkomani R. D (Zim)
Nhare: 0776 592 141

Zvamunofanira kuziva maerarano neongororo ino:

- Tinokupai gwaro rino kuti muverenge pamusoro pechinangwa, zvakaipira pamwe chete nezvakanakira ongororo ino.
- Kubatsirwa kunoita nguva nenguva kunobva pamarapirwo akanaka anozivikanwa panguva iyoyo uye izvi zvinoitwa nechinangwa chekubatsira murwere mumwe nemumwe.
- Hatingakuvimbisei kuti pane zvamungawana kubva muongororo ino.
- Mune kodzero yekuramba kupinda muongororo ino, kana kubvuma kupinda muongororo ino kwenguva ino asi mozofunga kuregedza pave paya.
- Sarudzo yamunenge maita iyi haizokanganisi marapirwo enyu amunosiitwa nguva dzose.
- Nyatsoverengai gwaro rino mobvunza mibvunzo yamungada kubvunza musati maita sarudzo yenyu.
- Kupinda kwenyu muongororo ino kuri pachena, hakuna muripo wamunozopihwa.

CHINANGWA

Muri kukumbirwa kuti mupinde muongororo yekuona ruzivo rwenyu, maonero pamwe chete nemaitiro enyu pamusoro pechirwere cheshuga cheType 2, kuburikidza nemibvinzo yakanyorwa pasi yamuchaita zvokuverengerwa. Chinangwa cheongororo ino ndechekuona mwero pamwe chete nemashandiro/mabatsiriro anoita zvidzidzo pamusoro pekuzvirapa chirwere cheshuga takanyanyonangana nekudya kuneutano kunovaka muviri pamwe chete nemaitiro nemagariro akanaka, pakuvandudza ruzivo, maonero pamwe chete nemaitiro evanhu vakuru vanorwara nechirwere cheshuga chetype 2 mumakiriniki ari muHarare, Zimbabwe. Kukosha kwezvirongwa zvekudzidzisa varwere veshuga pamusoro pekuzvirapa nekuzvichengetedza kwakaonekwa kwenguva yareba. Dzidziso yakanaka pamusoro pekuzvirapa nekuzvichengetedza pachirwere cheshuga inobatsira pakudzikamisa shuga muropa remurwere. Nekudaro, zvakakosha kuti vanoshanda mubazi rezveutano vagare vachiongorora mabatsiriro pamwe chete nemashandiro ezvirongwa zvekudzidzisa pamusoro pechirwere cheshuga zvinenge zviripo panguva iyoyo pakuvanduka ruzivo, maonero

pamwe chete nemaitiro emurwere weshuga. Ongororo ino ichatarisa ruzivo, maonero pamwe chete nemaitiro evarwere veshuga tichishandisa mibvunzo yakanyorwa pasi, nechinangwa chekuona zvakanakira pamwe chete nepakasaririra zvirongwa zviripo parizvino zvekudzidzisa pamusoro pechirwere cheshuga.

Makasarudzwa semumwe wevanhu vakakodzera kunge vachipinda muongororo ino nekuda kwekuti **muri munhu mukuru anorwara nechirwere cheshuga cheType 2 Mellitus, uye kuti munorapwa pane chimwe chezvipatara zvakasarudzwa paongororo ino.** Vanhu vangangosvika zana nemakumi mana (140) vachasarudzwa kubva muzvipatara zvakasiyana siyana zvakasarudzwa muHarare, zvinosanganisira chipatara cheParirenyatwa, Harare Hospital Diabetes Outpatient clinic pamwe chete nemakiriniki ekanzuru ari muHarare.

Zvinotevera ndizvo zvipatara nemakiriniki akasarudzwa muongororo ino:

1. Parirenyatwa out-patient Dept Diabete clinic
2. Harare Hospital out-patient Dept Diabetes clinic
3. Borrowdale Clinic
4. Highlands Primary Care Clinic
5. Mbare Poly-clinic
6. Highfields Poly-clinic
7. Glen View Poly-clinic
8. Rujeko Poly-clinic

MATANHO PAMWE CHETE NENGUVA INOTORWA PAONGORORO INO

Muchakumbirwa kuti muzviverengere gwaro rino rekupa mvumo, kana kuita zvokuverengerwa nemunhu ari kuita basa iri rekuongorora. Kana muchinge masarudza kupinda muongororo ino, muchakumbirwa kuti munyore zita renyu pamwe chete nekusaina gwaro rino rekupa mvumo sechisimbiso chekuti mabvumirana nazvo. Muchakumbirwa kuti mupindure mibvunzo pamusoro peruzivo rwenyu, maonero kana maitiro enyu maererano nekuzvirapa chirwere cheshuga. Izvi zvinozoongororwa kuburikidza negwaro remibvunzo ramuchaita zvokuverengerwa. Mibvunzo iyi ingangotore nguva ingasvike maminetsi makumi maviri (20)kusvika kumaminetsi makumi maviri nemashanu (25). Kunze kwekupindura mibvunzo iyi, hapanazve zvimwe zvinhu zvingazodiwe kuti munge muchiitazve muongororo ino. Munotarisirwa kuti mupindure mibvunzo yose muri pachokwadi, semaziviro amunoita mibvunzo yamunenge mabvunzwa. Gwaro roga roga remibvunzo rinoshandiswa muongororo ino richapihwa nhamba yaro kuitira kuti tirege kuzoshandisa zita renyu pagwaro iroro.

NJODZI KANA ZVIMWE ZVISINGAFADZI ZVIRI MAERARANO NEONGORORO INO

Hapana njodzi kana zvimwe zvinhu zvisingafadzi zvinotarisirwa kuti mungasangana nazvo paongororo ino, zvisiri zvekuti mungangode kutora mamwe maminetsi makumi maviri kusvika kumaminetsi makumi maviri nemashanu muchipindura mibvunzo yeongororo ino muri pakiriniki pamunenge mauya kuzorapwa .

ZVAMUNGAWANA KANA KUTI MURIPO WAMUNGAPIHWA

Hapana zvingatarisirwa kuti mungawana kana muripo wamungapihwa pakupinda kwenyu muongororo ino, asi kuti ruzivo rwatichawana kubva kwamuri ruchabatsira zvakanyanya kuvashandi vezveutano vanoshandira kudivi rekurapwa kwechirwere cheshuga. Ruzivo urwu runogona kuzokubatsirai mune ramangwana nekuti zvirongwa zvekudzidzisa varwere veshuga pamusoro pekuzvirapa nekuzvichengeta zvinogona kuzogadzirwa kuti zvinangane nezvamungade imi, zvichibva
paongororo inenge yaitwa pamusoro peruzivo rwenyu, maonero pamwe chete nemaitiro enyu maererano nechirwere cheshuga.

Hapana muripo wamunozopihwa pakubvuma kwenyu kupinda muongororo ino.

KUSASHAMBADZWA/KUSAFUMURWA

Ruzivo rupi zvarwo rwamunenge matipa muongororo ino, rune chekuita nemi haruzoshambadzwi kana kufumurwa, ruzivo urwu runongozoburitswa bedzi kana imi muchinge matipa mvumo. Zita renyu bedzi ndiro rinongozonyorwa pekupedzisira pegwaro rekupa mvumo. Gwaro remibvunzo harizonyorwi zita renyu. Ruzivo rwatinenge tawana muongororo ino runozochengetedzwa panzvimbo yakabata. Gwaro remibvunzo pamwe chete negwaro rekupa mvumo zvinozochengetwa panzvimbo dzakasiyana kuitira kuti gwaro remibvunzo risazozivikanwa kuti nderenyu. Muongorori mukuru ndiye chete anozokwanisa kutarisa nekuona ruzivo urwu. Nekusarudza kupinda muongororo ino, munonzwisisa pamwe chete nekuwirirana nekuti ruzivo rwatichawana kubva muongororo ino runozoshandiswa nemuongorori mukuru pakunyora magwaro ake anogona kuzoverengwa nevoruzhinji. Kunyangwe zvakadaro, zita renyu kana rumwe ruzivo rungagone kuratidza kuti ndimi muri kutaurwa nezvake hazvizoburitswi kana kunyorwa mumagwaro anozonyorwa nemuongorori mukuru aya. Pane dzimwewo nguva, veMRCZ pamwe chete nemimwe misangano vangangozode kuongororazve ruzivo rwatinenge tawana kubva kwamuri kuburikidza negwaro remibvunzo pavanenge vachiitawo ongororo yavowo.

KUZVIPIRA KUPINDA MUONGORORO INO

Kupinda muongororo ino ndekwekuzvipira. Kana muchinge masarudza kusapinda muongororo ino, hazvizokanganisi marapirwo enyu amunoitwa pakiriniki ipi zvayo. Kana muchinge masarudza kupinda, makasununguka kuzobuda muongororo iyi chero nguva pasina mutongo.

ZVIMWEWO ZVIRI MAERERANO NEONGORORO INO

Ongororo ino inoitwa ichitevedzera zvakatemwa nezvakarairwa neDeclaration of Helsinki pamwe chete neInternational Council of Human Rights and Medical Research Council Guidelines.

KUZVIPIRA KUPINDURA MIBVUNZO

Musati masaina gwaro rino, ndapota bvunzai mibvunzo yamungadai munayo pane chipi zvacho chiri maererano neongororo ino chamungadai musina kunyatsonzwisisa. Makasungunguka kunyatsotora nguva yenyu muchinyatsofunga nezvazvo.

KUPA MVUMO

Muri kuita sarudzo yekupinda kana kusapinda muongororo ino. Siginecha yenyu inoreva kuti maverenga mukanzwisisa ruzivo rwamapihwa rwakanyora pano, mibvunzo yose yamanga munayo yapindurwa uye masarudza kupinda muongororo ino.

Zita remunhu apinda muongororo Zuva

Siginecha yemunhu apinda muongororo Nguva

Siginecha yemufakazi Siginecha yemuongorori apihwa mvumo

MUCHAPIHWAWO GWARO RAKAFANANA NERINO KUTI MUGAREWO NARO

Kana muchinge muine mimwe mibvunzo maererano neongororo ino kana gwaro rino rekupa mvumo, isiri yamambopindurwa nemuongorori, inosanganisira mibvunzo pamusoro peongororo, kodzero dzenyu semunhu apinda muongororo, kana zvine chekuita nenjodzi kana kukuvara kungangoitika muongororo ino, kana kuti maona sekuti hamuna kubatwa zvakanaka uye kuti mungade kutaura nemumwewo munhu asiri nhengo yechikwata chiri kuita ongororo ino, makasununguka kutaura neveMedical Research Council of Zimbabwe panhare dzinoti 791792 kana 791193

VeMRCZ vanowanikwa pa
Cnr Josiah Tongogara/Mazowe Street
Harare
Zimbabwe

APPENDIX 6: Informed consent form for health professional – English

INFORMED CONSENT FORM

HEALTH PROFESSIONALS

Assessing the Extent and Effectiveness of Diabetes Self Management in Public Health Care Institutions in Harare Zimbabwe

Principal Investigator: Sanele Nkomani R.D (Zim)

Phone number(s):0776 592 141

WHAT YOU SHOULD KNOW ABOUT THIS RESEARCH STUDY:

- We give you this consent form so that you may read about the purpose, risks, and benefits of this research study.
- Routine care is based upon the best known treatment and is provided with the main goal of helping the individual patient. The main goal of research studies is to gain knowledge that may help future patients.
- We cannot promise that this research will benefit you.
- You have the right to refuse to take part, or agree to take part now and change your mind later.
- Whatever you decide, it will not affect your regular work.
- Please review this consent form carefully. Ask any questions before you make a decision.
- Your participation is voluntary.

PURPOSE

You are being invited to participate in a research study assessing the level of resources and support for Diabetes self- management at your clinic. This study has 2 components, namely a questionnaire for patients with Type 2 Diabetes which assesses their knowledge, attitudes and practices with regard to self-management of their condition, with a specific focus on nutrition. The second component is survey which is completed by health professionals who work in the field of diabetes care. This survey was developed in order to help primary health care facilities (clinics) improve systems and services which support patients with chronic diseases like Diabetes.

If you agree to participate in this study, you will be asked to complete the Primary Care Resources and Supports for Chronic Disease self-management (PCRS) survey. The purpose of the survey is to help primary care facilities focus on actions that can be taken to support self- management by patients with Diabetes and other chronic conditions. The survey was developed by the Robert Wood Johnson Foundation in the United States of America.

The importance of standardized Diabetes self-management education programs in improving knowledge and skills of patients has long been established. Effective diabetes education programmes have been shown to have a positive effect on patient blood glucose control. It is therefore necessary for health care workers to continuously evaluate

how effective current diabetes education programs are in improving patient self-management knowledge, attitudes and practices. This study will assess knowledge, attitudes and practices of Diabetic Patients through a questionnaire administered to the participant's. In addition to the participant questionnaire, health professionals in primary health care facilities that treat diabetic patients will be asked to complete the PCRS tool. The two tools (i.e. patient questionnaire and PCRS tool) will be used to identify the strengths and weaknesses of current diabetes education programs in Harare.

You were selected as a possible participant in this study because **you are a health professional (physician, nurse, nutritionist/dietitian, community health workers or other) working in the field of diabetes at a selected facility.** As many health professionals as possible, who are willing to participate will be selected from various health care centres in Harare which include Parirenytwa Hospital, Harare Hospital Diabetes Outpatient clinics and City Health Clinics.

The following are the facilities that were selected for inclusion in the study:

1. Parirenyatwa Out-patient dept Diabetes clinic
2. Harare Hospital Out-patient Dept Diabetes clinic
3. Borrowdale Clinic
4. Highlands Primary Care Clinic
5. Mbare Poly-clinic
6. Highfields Poly-clinic
7. Glen View Poly-clinic
8. Rujeko Poly-clinic

PROCEDURES AND DURATION

You will be asked to read this consent form on your own or with a field worker. If you decide to participate in the study you will be asked to print your name and sign this consent form as proof of your agreement. Then you will be asked to complete the PCRS tool at your own convenience. The PCRS survey asks you to rate 16 charactestics of self -management resources and support on a numeric scale of 1-10. These scores are based on your knowledge, experience and observations on how well your facility addresses the characteristics of the survey- there are no right or wrong answers.

The survey is completed individually and typically takes about 30-45 minutes to complete. No further involvement will be required from you. It is your responsibility to answer all questions honestly and to the best of your ability. Each survey will be assigned a number for identification so that your name is not on the survey.

RISKS AND DISCOMFORTS

There are no reasonably foreseeable risks and discomforts associated with taking part in this study beyond the potential inconvenience of having to spend an extra +/- 30-45 minutes to complete the form at your convenience.

BENEFITS AND/OR COMPENSATION

There may be no direct personal benefit from your participation in the study, however the knowledge received from you will be important in evaluating Diabetes self-management Education programs. Furthermore your responses will be used to make recommendations for improvement of Diabetes care. This knowledge may benefit you in the future as it may allow you to self-evaluate how effect your facility is in empowering type 2 Diabetic patients to manage their condition.

You will not receive any compensation for agreeing to participate in this study.

CONFIDENTIALITY

Any information that is obtained in connection with this study that can be identified with you will remain confidential and will be disclosed only with your permission. Your name is the only personal information that will be recorded at the end of this consent form. The PCRS survey will not have your name on it. Study data will be kept in a secure location. Your questionnaire and consent form will be kept in separate locations such that your survey always remains anonymous. The principle researcher is the only person who will have access to study data.

By agreeing to participate in this study you understand and agree that data and information gathered through the study may be used by the principle investigator in publications. However your name or any other piece of information that can reveal your identity will not be mentioned in the dissemination of results nor will it be mentioned in publications. Under some circumstances, the MRCZ and other ethics boards may need to review information obtained from you through the surveys for compliance audits.

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you decide not to participate in this study, your decision will not affect negatively you in any way. If you decide to participate, you are free to withdraw your consent and discontinue participation at any point in the process without penalty.

ADDITIONAL ELEMENTS

The Study will be carried out according to the Declaration of Helsinki and the International Council of Human Rights and Medical Research Council Guidelines.

OFFER TO ANSWER QUESTIONS

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over.

AUTHORIZATION

You are making a decision whether or not to participate in this study. Your signature indicates that you have read and understood the information provided above, have had all your questions answered, and have decided to participate.

Name of Research Participant (please print) Date

_____ _____

Signature of Participant or legally authorized representative Time

_____ _____

Signature of Witness Signature of Staff Obtaining Consent

YOU WILL BE GIVEN A COPY OF THIS CONSENT FORM TO KEEP.

If you have any questions concerning this study or consent form beyond those answered by the investigator, including questions about the research, your rights as a research participant or research-related injuries; or if you feel that you have been treated unfairly and would like to talk to someone other than a member of the research team, please feel free to contact the Medical Research Council of Zimbabwe on telephone 791792 or 791193.
Physical Address of MRCZ:
Cnr Josiah Tongogara / Mazowe Street, Harare, Zimbabwe

APPENDIX 7: Informed consent form for Health professionals- Shona

GWARO ROKUPA MVUMO

VASHANDI VEZVEUTANO

Kuongorora mwero pamwe chete nemashandiro anoita chirongwa chekuzvirapa chirerwe cheshuga muzvipatara zvehurumende muHarare Zimbabwe

Muongorori Mukuru: Sanele Nkomani R. D (Zim)

Nhare: 0776 592 141

ZVAMUNOFANIRA KUZIVA MAERARANO NEONGORORO INO:

- Tinokupai gwaro rino kuti muverenge pamusoro pechinangwa, zvakaipira pamwechete nezvakanakira ongororo ino.
- Kubatsirwa nekurapwa kunoita nguva nenguva kunobva pamarapirwo akanaka anozivikanwa panguva iyoyo uye izvi zvinoitwa nechinangwa chekubatsira murwere mumwe nemumwe. Chinangwa chikuru chezvirongwa zveongororo ndechekuvandudza ruzivo runogona kuzobatsira varwere veshuga vamangwana.
- Hatingakuvimbisei kuti pane zvamungawana kubva muongororo ino.
- Mune kodzero yekuramba kupinda muongororo ino, kana kubvuma kupinda muongororo ino kwenguva ino asi mozofunga kuregedza pave paya.
- Sarudzo yamunenge maita iyi haizokanganisi mashandiro enyu enguva dzose.
- Nyatsoverengai gwaro rino mobvunza mibvunzo yamungada kubvunza musati maita sarudzo yenyu.
- Kupinda kwenyu muongororo ino kuri pachena, hakuna muripo wamunozopihwa.

CHINANGWA

Muri kukumbirwa kuti mupinde muongororo yekuona uwandu hwezvamunazvo zvamunoshandisa pamwe chete nerutsigiro rwamunarwo pachirongwa chekuzvirapa chirwere cheshuga chamunoita pakiriniki yenyu. Ongororo ino ine zvinhu zviviri, zvinoti gwaro remibvunzo inobvunzwa varwere veshuga yeType 2, iyo inotarisa ruzivo rwavo, maonero pamwe chete nemaitiro avo pamusoro pekuzvirapa nekuzvichengetedza, takanyanyonangana nekudya kwakanana kunovaka muviri. Chikamu chechipiri cheongororo ino chinopindurwa nevashandi vezveutano vanoshandira kudivi rekurapwa kwechirwere cheshuga. Ongororo ino yakagadzirwa nechinangwa chekubatsira makiriniki pakuvandudza maitiro pamwe chete nenzira dzavanoshandisa pakutsigira vanhu vanorwara nezvirwere zveupenyu hwose zvisingarapike nyore zvakaita sechirwere cheshuga.

Kana muchinge masarudza kupinda muongororo ino, munozokumbirwa kuti mupindure gwaro reZvinoshandiswa pamwe chete neRutsigiro runopihwa pakuzvirapa nekuzvichengeta paZvirwere zveupenyu hwose zvisingaperi nyore (Primary Care Resources and Supports for Chronic Disease Self management [PCRS] survey). Chinangwa cheongororo ino ndechekubatsira makiriniki kuti vanangane nenzira dzingatorwe pakubatsira varwere veshuga pamwe chete nezvimwewo zvirwere zveupenyu hwose zvisingaperi nyore pakuzvirapa nekuzvichengeta.

Ongororo yePCRS yakatangwa neveRobert Wood Johnson Foundation muUnited States of America.
Magwaro maviri aya (gwaro remibvunzo inobvunzwa murwere pamwe chete negwaro rePCRS) achashandiswa pakuona zvakanakira pamwe chete nepakasaririra zvirongwa zviripo parizvino zvekudzidzisa pamusoro pechirwere cheshuga muHarare.

Makasarudzwa semumwe wevanhu vakakodzera kunge vachipinda muongororo ino nekuda kwekuti **muri mushandi wezveutano (mukoti, munoshanda kubazi rezvekudya kuneutano kunovaka muviri, muri mushandi wezveutano anoshanda munharaunda kana zvimwewo) uye munoshandira divi rechirwere cheshuga paimwe yemakiriniki akasarudzwa muongororo ino.** Vashandi vezveutano vakawanda kwazvo, vanoda kupinda muongororo ino, vachasarudza kubva mumakiriniki nezvipatara zviri muHarare zvinosanganisira chipatara cheParirenyatwa, Harare Hospital Diabetes Outpatient clinics pamwe chete nemakiriniki ekanzuru ari muHarare.

Zvinotevera ndizvo zvipatara nemakiriniki akasarudzwa muongororo ino:

1. Parirenyatwa out-patient Dept Diabetes clinic
2. Harare Hospital out-patient Dept Diabetes clinic
3. Borrowdale Clinic
4. Highlands Primary Care Clinic
5. Mbare Poly-clinic
6. Highfields Poly-clinic
7. Glen View Poly-clinic
8. Rujeko Poly-clinic

MATANHO PAMWE CHETE NENGUVA INOTORWA PAONGORORO INO

Muchakumbirwa kuti muzviverengere gwaro rino rekupa mvumo, kana kuita zvokuverengerwa nemunhu ari kuita basa iri rekuongorora. Kana muchinge masarudza kupinda muongororo ino, muchakumbirwa kuti munyore zita renyu pamwe chete nekusaina gwaro rino rekupa mvumo sechisimbiso chekuti mabvumirana nazvo. Muchakumbirwa kuti mupindure mibvunzo yakanyorwa pagwaro rePCRS panguva yakakusununguki rai imi. Ongororo yePCRS ichakukumbirai kuti mutarise zvinhu gumi nezvitanhatu (16) zvemidziyo, mishonga kana zvimwe zvinhu zvinoshandiswa pamwe chete nerutsigiro runopihwa pakuzvirapa chirwere cheshuga muchizviisa pachikero chine nhamba 1 kusvika ku 10. Zvibozwa zvamuchasarudza apa zvinenge zvichibva paruzivo rwenyu, nguva yamave nayo muchishanda basa iri pamwe chete nezvamunoona kana zvamakaona pamashandiro anoita kiriniki yenyu maererano nezvinhu zviri kubvunzwa muongororo ino- hakuna mhinduro dzatinoti idzi dzakanaka kana kuti idzi dzakashata.
Gwaro reongororo iyi rinopindurwa nemunhu mumwe chete, uye rinowanzotora nguva ingangoite maminetsi makumi matatu (30) kusvika kumakumi mana namashanu (45). Kunze kwekupindura mibvunzo iyi, hapanazve zvimwe zvinhu zvingazodiwe kuti munge muchiitazve muongororo ino. Munotarisirwa kuti mupindure mibvunzo yose muri pachokwadi, semaziviro amunoita mibvunzo yamunenge mabvunzwa. Gwaro roga roga

remibvunzo rinoshandiswa muongororo ino richapihwa nhamba yaro kuitira kuti tirege kuzoshandisa zita renyu pagwaro iroro.

NJODZI KANA ZVIMWE ZVISINGAFADZI ZVIRI MAERARANO NEONGORORO INO Hapana njodzi kana zvimwe zvinhu zvisingafadzi zvinotarisirwa kuti mungasangana nazvo paongororo ino, zvisiri zvekuti mungangode kutora maminetsi makumi matatu kusvika kumaminetsi makumi mana nemashanu muchipindura mubvunzo yeongororo ino panguva yakakusunungukirai imi.

ZVAMUNGAWANA KANA KUTI MURIPO WAMUNGAPIHWA

Hapana zvingatarisirwa kuti mungawana kana muripo wamungapihwa pakupinda kwenyu muongororo ino, asi kuti ruzivo rwatichawana kubva kwamuri ruchabatsira zvakanyanya pakuongorora zvirongwa zvekudzidzisa pamusoro pekuzvirapa nekuzvichengetedza pachirwere cheshuga. Pamusoro pezvo, mhinduro dzenyu dzichashandiswa pakusimbisa nekukurudzira kuti chirongwa chekurapa chirwere cheshuga chivandudzwe. Ruzivo urwu runogona kuzokubatsirai mune ramangwana sezvo chichizoita kuti muzvinzvere nekuzviongorora imi pachenyu sekiriniki kuti muone kuti kiriniki yenyu iri kubatsira sei pakusimudzira nekubatsira varwere veshuga yeType 2 pakuzvirapa nekuzvichengetedza paurwere hwavo.

Hapana muripo wamunozopihwa pakubvuma kwenyu kupinda muongororo ino.

KUSASHAMBADZWA/KUSAFUMURWA

Ruzivo rupi zvarwo rwamunenge matipa muongororo ino, rune chekuita nemi haruzoshambadzwi kana kufumurwa, ruzivo urwu runongozoburitswa bedzi kana imi muchinge matipa mvumo. Zita renyu bedzi ndiro rinongozonyorwa pekupedzisira pegwaro rekupa mvumo. Gwaro remibvunzo rePCRS harizonyorwi zita renyu. Ruzivo rwatinenge tawana muongororo ino runozochengetedzwa panzvimbo yakabata. Gwaro remibvunzo pamwe chete negwaro rekupa mvumo zvinozochengetwa panzvimbo dzakasiyana kuitira kuti gwaro remibvunzo risazozivikanwa kuti nderenyu. Muongorori mukuru ndiye chete anozokwanisa kutarisa nekuona ruzivo urwu.

Nekusarudza kupinda muongororo ino, munonzwisisa pamwe chete nekuwirirana nekuti ruzivo rwatichawana kubva muongororo ino runozoshandiswa nemuongorori mukuru pakunyora magwaro ake anogona kuzoverengwa nevoruzhinji. Kunyangwe zvakadaro, zita renyu kana rumwe ruzivo rungagone kuratidza kuti ndimi muri kutaurwa nezvake hazvizoburitswi kana kunyorwa mumagwaro anozonyorwa nemuongorori mukuru aya. Panedzimwewo nguva, veMRCZ pamwe chete nemimwe misangano vangangozode kuongororazve ruzivo rwatinenge tawana kubva kwamuri kuburikidza negwaro remibvunzo pavanenge vachiitawo ongororo yavowo.

KUZVIPIRA KUPINDA MUONGORORO INO

Kupinda muongororo ino ndekwekuzvipira. Kana muchinge masarudza kusapinda muongororo ino, hazvizokukanganisei nenzira ipi zvayo. Kana muchinge masarudza kupinda, makasununguka kuzobuda muongororo iyi chero nguva pasina mutongo.

KUZVIPIRA KUPINDURA MIBVUNZO

Musati masaina gwaro rino, ndapota bvunzai mibvunzo yamungadai munayo pane chipi zvacho chiri maererano neongororo ino chamungadai musina kunyatsonzwisisa. Makasungunguka kunyatsotora nguva yenyu muchinyatsofunga nezvazvo.

KUPA MVUMO

Muri kuita sarudzo yekupinda kana kusapinda muongororo ino. Siginecha yenyu inoreva kuti maverenga mukanzwisisa ruzivo rwamapihwa rwakanyora pano, mibvunzo yose yamanga munayo yapindurwa uye masarudza kupinda muongororo ino.

Zita remunhu apinda muongororo Zuva

Siginecha yemunhu apinda muongororo Nguva

Siginecha yemufakazi Siginecha yemuongorori apihwa mvumo

MUCHAPIHWAWO GWARO RAKAFANANA NERINO KUTI MUGAREWO NARO

Kana muchinge muine mimwe mibvunzo maererano neongororo ino kana gwaro rino rekupa mvumo, isiri yamambopindurwa nemuongorori, inosanganisira mibvunzo pamusoro peongororo, kodzero dzenyu semunhu apinda muongororo, kana zvine chekuita nenjodzi kana kukuvara kungangoitika muongororo ino, kana kuti maona sekuti hamuna kubatwa zvakanaka uye kuti mungade kutaura nemumwe munhu asiri nhengo yechikwata chiri kuita ongororo ino, makasununguka kutaura neveMedical Research Council of Zimbabwe panhare dzinoti 791792 kana 791193

VeMRCZ vanowanikwa pa
Cnr Josiah Tongogara/Mazowe Street, Harare, Zimbabwe

APPENDIX 8: Pre-screening form for T2DM patients

PRE-SCREENING FORM

Participant Number	Date	Location	Eligibility	Consent given?

ELIGIBILITY- EXCLUSION CRITERIA

Write IE for ineligible patients

1. Under 18 years old
2. Did not provide informed consent
3. Non Type 2 diabetes
4. Severe Acute Illness

ELIGIBLE PATIENTS- E

5. Write **E** for eligible participants.
6. If eligible however refused to consent**: E- refused to consent**
7. If eligible but withdrew: **E- consent withdrawn**

APPENDIX 9: Quality control checklist

CLINIC CHECKLIST/ QUALITY CONTROL

This form is for the completion of the **Quality Control officer**, at the end of each clinic visit.

FACILITY:

.....

Date:

.....

Number of Informed Consent Forms Issued:	
Number left after each day:	

TWO informed consent forms should be completed for each participant. **One copy should be given to the participant** to take home.

	Yes/No	Signature
1. Check that all participants were given a copy of informed consent form?		
2. Check that all relevant signatures/dates are on informed consent forms (participant, witness, staff)		

Target Patient sample size:		**Number of completed Patient questionnaires:**	
Health Care workers involved in Diabetes Care		**Number of completed PCRS tools**	

MEASURING TOOLS QUALITY CONTROL

1. Check for Missing fields on Patient Questionnaire:	Yes/No	Signature
2. Check for missing fields on PCRS tool:		
3. Check for consistency in answering of questions on Patient questionnaires		
4. Checking for consistency in answering questions in PCRS tool		

APPENDIX 10: Budget Considerations

Price Estimations are in US Dollars as this is the currency used in Zimbabwe. Current USD/Rand exchange rate- 1: 14.8

EXPENSE	ESTIMATED COST		RATIONALE
	USD	RAND	
Transport	$120	R 1800	Estimated distance from the principle researcher home to furthest clinic and back at least 3 times a week. These are provisions for 2 cars i.e. the principle researcher and the two field workers. Estimated total distance around to and fro around clinics in Harare +/- 100 km for the 6 weeks of study.
Stationary which includes papers, pens etc	$68	R 1000	Pens, highlighters, pencils,
Photocopying and Printing of forms	$102	R 1500	160 copies of diabetic patient questionnaire (20 extra) 160 consent forms 30 copies of PRCS form for HCW's
Food Allowance	$51	R750	Lunch for 2 field workers at +/- $3 each
Telephone	$35	R 500	Coordinating with field workers and various clinics and personnel.
English-Shona Translator	$200	R2960	Health Research Council of Zimbabwe requires that questionnaires and informed consent forms must be translated to at least 1 local language
Ethics processing fees	$200	R2960	MRCZ $50 City of Harare $50 JREC $50 Harare Hospital $50
Total	**USD 776**	**R 14 470**	

APPENDIX 11: Stellenbosch University Health Research Ethics (HREC) approval

UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

Approval Notice
New Application

26-May-2014
Nkomani, Sanele S

Ethics Reference #: S14/03/063

Title: **Assessing the extent and effectiveness of Diabetes Self Management Education (DSME) with a specific focus on Medical Nutrition Therapy interventions in improving the knowledge attitudes and key coping skills of adult (18+ years) Type 2 diabetes in Public Health Care Institutions Harare, Zimbabwe.**

Dear Sanele Nkomani,

The New Application received on 28-Mar-2014, was reviewed by members of Health Research Ethics Committee 2 via Expedited review procedures on 23-May-2014 and was approved.
Please note the following information about your approved research protocol:

Protocol Approval Period: **23-May-2014 -23-May-2015**

Please remember to use your **protocol number** (**S14/03/063**) on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:
Please note a template of the progress report is obtainable on www.sun.ac.za/rds and should be submitted to the Committee before the year has expired. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.
Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372
Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health (healthres@pgwc.gov.za Tel: +27 21 483 9907) and Dr Helene Visser at City Health (Helene.Visser@capetown.gov.za Tel: +27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.
For standard HREC forms and documents please visit: www.sun.ac.za/rds

If you have any questions or need further assistance, please contact the HREC office at 0219389207.

Included Documents:
Supervisor declaration
Institution assessment of DSME

APPENDIX 12: Medical Research Council of Zimababwe Ethics Approval

Telephone: 791792/791193
Facsimile: (263) -4 - 790915
E mail: mrcz@mrcz.org.zw
Website: http://www.mrcz.org.zw

Medical Research Council of Zimbabwe
Josiah Tongogara / Mazoe Street
P. O. Box CY 573
Causeway
Harare

APPROVAL

REF: MRCZ/E/921 13 October 2015

Sanele Nkomani
University of Zimbabwe
College of Health Sciences
P.O BOX A 178
Avondale
Harare

RE:- Assessing the effectiveness of diabetes Self Management Education (DSME) with a specific focus on Medical Nutrition Therapy (MNT) and lifestyle interventions in improving knowledge, attitudes and practices of adult (18+ years) Type 2 Diabetics in Harare, Zimbabwe.

Thank you for the application for review of Research Activity that you submitted to the Medical Research Council of Zimbabwe (MRCZ). Please be advised that the Medical Research Council of Zimbabwe has reviewed and approved your application to conduct the above titled study.

This approval is based on the review and approval of the following documents that were submitted to MRCZ for review:-

a) Study proposal
b) Informed Consent form for Health professionals (English and Shona)
c) Informed Consent form for diabetic patients (English and Shona)
d) Data Collection tools (English and Shona)

- **TYPE OF MEETING** : Expedited
- **EFFECTIVE APPROVAL DATE** : 13 October 2015
- **EXPIRATION DATE** : 12 October 2016

After this date, this project may only continue upon renewal. For purposes of renewal, a progress report on a standard form obtainable from the MRCZ Offices should be submitted three months before the expiration date for continuing review.

•**SERIOUS ADVERSE EVENT REPORTING**: All serious problems having to do with subject safety must be reported to the Institutional Ethical Review Committee (IERC) as well as the MRCZ within 3 working days using standard forms obtainable from the MRCZ Offices or website.

•**MODIFICATIONS**: Prior MRCZ and IERC approval using standard forms obtainable from the MRCZ Offices is required before implementing any changes in the Protocol (including changes in the consent documents).

•**TERMINATION OF STUDY**: On termination of a study, a report has to be submitted to the MRCZ using standard forms obtainable from the MRCZ Offices or website.

•**QUESTIONS**: Please contact the MRCZ on Telephone No. (04) 791792, 791193 or by e-mail on mrcz@mrcz.org.zw

Other

- Please be reminded to send in copies of your research results for our records as well as for Health Research Database
- You're also encouraged to submit electronic copies of your publications in peer-reviewed journals that may emanate from this study.

MEDICAL RESEARCH COUNCIL OF ZIMBABWE
APPROVED
P.O. BOX CY 573 CAUSEWAY, HARARE

Yours Faithfully

MRCZ SECRETARIAT
FOR CHAIRPERSON
MEDICAL RESEARCH COUNCIL OF ZIMBABWE

PROMOTING THE ETHICAL CONDUCT OF HEALTH RESEARCH

APPENDIX 13: City of Harare institutional review board approval

CITY OF HARARE

DIRECTOR OF HEALTH SERVICES

Rowan Martin Building,
Leopold Takawira Avenue,
P.O. Box 366
Telephone : 752558
Fax No. (263-4) 752093

04 November 2014

Sanele Nkomani
4 Rod Close
HARARE

Dear Madam

RE: PERMISSION TO CARRY OUT A RESEARCH PROJECT

I acknowledge receipt of your letter in connection with the above.

Permission has been granted for you to carry out a study titled ***"Assessing the Extent and effectiveness of diabetes self management education in public health care institutions in Harare"***.

You will be required to pay US$50.00 administration fee prior to commencement of the study. The fee is payable to City Health Department, 6th floor, Rowan Martin Building.

Please be also advised that it is our institutional policy that written permission should be sought from the department prior to any presentation or publication of research findings.

Yours faithfully

DIRECTOR OF HEALTH SERVICES
IM/rm

c.c. Ethics Committee

APPENDIX 14: Joint Research Ethics board (JREC) approval

Joint Research Ethics Committee
For The University of Zimbabwe,
College of Health Sciences and
Parirenyatwa Group of Hospitals

Parirenyatwa Group of Hospitals

JREC Office No. 4, 5th Floor College of Health Sciences Building
Telephone: +263 4 708140/ 791631 Exts 2241/2242
Email:jrec.office@gmail.com/jrec@medsch.uz.ac.zw, website:www.jrec.uz.ac.zw

University of Zimbabwe
College of Health Sciences

APPROVAL LETTER

Date: 12th April 2015 **JREC Ref: 29/15**

Names of Researcher: **Sanele Nkomani**
Address: University of Zimbabwe, Department of Community Medicine

RE: **ASSESSING THE EXTENT AND EFFECTIVENESS OF DIABETES SELF-MANAGEMENT EDUCATION (DSME) WITH A SPECIFIC FOCUS ON MEDICAL NUTRITION THERAPY (MNT) AND LIFESTYLE INTERVENTIONS IN IMPROVING KNOWLEDGE, ATTITUDES AND PRACTICES OF ADULT (18+ YEARS) TYPE 2 DIABETICS IN HARARE, ZIMBABWE.**

Thank you for your application for ethical review of the above mentioned research to the Joint Research Ethics Committee. Please be advised that the Joint Research Ethics Committee has reviewed and approved your application to conduct the above named study. You are still required to obtain MRCZ approval and if required by the nature of your study, RCZ approval as well. before you commence the study.

- **APPROVAL NUMBER:** JREC/29/15
- **APPROVAL DATE:** 12th April 2015
- **EXPIRY DATE:** 11th April 2016

This approval is based on the review and approval of the following documents that were submitted to the Joint Ethics Committee:

a) Completed application form
b) Full Study Protocol
c) Informed Consent in English and/or appropriate local language
d) Data collection tool version:

After this date the study may only continue upon renewal. For purposes of renewal please submit a completed renewal form (obtainable from the JREC office) and the following documents before the expiry date:

a. A Progress report
b. A Summary of adverse events.

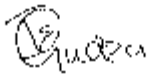
- **MODIFICATIONS:**

  Prior approval is required before implementing any changes in the protocol including changes in the informed consent.

- **TERMINATION OF STUDY**

  On termination of the study you are required to submit a completed request for termination form and a summary of the research findings/results.

Yours sincerely



Sr I Gudza
For JREC Chairman

APPENDIX 15: Harare hospital ethical review board approval

Telephone: 621100 19
Fax: 621152

Reference: HCHEC 031134/15

HARARE CENTRAL HOSPITAL
P O Box 3314
SOUTHERTON
Harare

28 November 2014

Ms. Sanele Nkomazi
4 Redrough Close
Mandara
HARARE

Dear Sanele,

RE: ASSESSING THE EXTENT AND EFFECTIVENESS OF DIABETES SELF MANAGEMENT EDUCATION IN PUBLIC HEALTH CARE INSTITUTIONS IN HARARE, ZIMBABWE

I am glad to advise you that your application to conduct a study entitled: Assessing The Extent And Effectiveness Of Diabetes Self Management Education In Public Health Care Institutions In Harare, Zimbabwe, has been approved by the Harare Hospital Ethics committee

This approval is premised on the submitted protocol. Should you decide to vary your protocol in any material way please submit these for further aproval.

You are advised to avail the results of your study whether positive or negative to the hospital through the committee for our information.

HARARE CENTRAL HOSPITAL
DEPARTMENT OF MEDICINE
28 NOV 2014
P.O. BOX 3314, SOUTHERTON
HARARE

Dr. C. Dasi
Chairman Harare Central Hospital Ethics Committee

APPENDIX 16: Letter of invitation to participate in research for clinics

Invitation to Participate in a Research Study Entitled; Assessing the Extent of Diabetes Self Management in Public Health Care Clinics In Harare, Zimbabwe : Glen View Poly-clinic

APRIL 2015

Principal Investigator: Sanele Nkomani R.D (Zim)

Phone number (s): 0776 592 141

Date:

Dear Sir/Madam

My name is Sanele Nkomani; I am currently enrolled as a Masters in Nutrition student at the University of Stellenbosch, South Africa. I would like to invite you to participate in my research project whose purpose is to assess your knowledge, attitudes and practices about Type 2 Diabetes.

Should you choose to participate you will be asked to come to your local clinic **.....**on the.....starting from 08:00 AM. The interview will take about 30 minutes of your time. When you arrive at the clinic, the nature of the study and your involvement will be further explained to you. You will be a given a consent form in either English or Shona, which will be read to you or you may read on your own. Once you have understood what is involved in the study, you will be asked to make a decision on whether you would like to participate. If you agree to participate, you will be asked to sign TWO copies of the consent form. You will keep one copy for future reference.

Once you have given your consent you will be asked to respond to questions that will be asked by the interviewer about what you know about managing your diabetes, your attitudes towards certain aspects of Diabetes care and finally your self-management practices will be assessed. These questions will be asked in either English or Shona depending on your preference.

You were selected as a possible participant in this study because you are an adult with Type 2 Diabetes Mellitus who receives treatment at one of the selected facilities.

Participation in this study is voluntary. If you decide not to participate in this study, your decision will not affect the quality of care you receive from your clinic. You are free to withdraw your consent and discontinue participation at any point in the process without penalty. The information you provide will be kept confidential. It will not include your name or any other identifying information.

There are no reasonable foreseeable risks and discomforts associated with taking part in this study beyond the potential inconvenience of giving part of your day.

You will be compensated USD 2 for your transport to get to and from the clinic. The knowledge gained from you this study may benefit you in the future as education programs can be tailored to your needs.

If you have any questions about your rights as a research participant, please contact the Medical Research Council of Zimbabwe on telephone 791792 or 791193.

Physical Address of MRCZ:
Cnr Josiah Tongogara / Mazowe Street
Harare
Zimbabwe

If you would like to know more about this research or have any other related questions, please contact me (see below information)

Sanele Nkomani -Principal Investigator
Phone Number: + 263 776 592 141
Email Address: sanele191@gmail.com

We look forward to your involvement

Thank you,

APPENDIX 17: Pre-test questionnaire results

Table 0-1 Demographic charactertisitcs

Gender	Female (n=4)	36.4%
	Male (n=7)	63.6%
Education level	Primary (n=7)	63.6%
	Secondary (n=4)	36.4%
Age	Mean age Standard Deviation	56% 18.5%
DIABETES EDUCATION PROFILE		
Received nutrition education	Yes (n=9)	81.8%
	No (n=4)	36.4%
Consultation with diabetes educator	Yes (n=6)	54.5%
	No (n=4)	36.4%
	Do not know (n=1)	9.1%
Consultation with dietitian	Yes (n=6)	54.5%
	No (n=4)	36.4%
	Do not know (n=1)	9.1%
Nutrition Information Source	Doctor (n=8)	72.7%
	Nurse (n=3)	27.3%
Medication	Yes (n=11)	100.0%
	Insulin	9.1%
	Both Insulin and Oral Medication	18.2%

Table 0-2 Pre-test survey results for diabetes knolwegde and item analysis

	Category Ranking	Item	Correct responses	Incorrect Responses	Comment	Status
METHODS OF DIABTEETS PREVENTION	1	Weight loss if overweight	n (9) 81.1%	n (2) 18%	Although highly endorsed, question was retained	Retained
	1	Eating less sugar	(9) 81.1%	(2) 18%		Retained
	1	Exercising regularly	(11) 100%	(0) 0%		Retained
	2	Reducing stress levels	(10) 90.9%	(1) 9.1%	High endorsement of correct response. Not essential to objectives	Deleted
	2	The Diabetes Diet is	(8) 72.7%	(3) 27.3%	Poorly understood and required further clarification	Deleted
	2	Eating less sugar is the cause of diabetes	(7) 63.7%	(4) 36.3%	Repetition	Deleted
	1	Foods that raise blood glucose	(6) 54.5%	(5) 45.5%	Response options changed	Retained
	1	Foods highest in fat	(6) 54.5%	(5) 45.5%		Retained
	1	Treating hypoglycaemia	(5) 45.5%	(6) 54.5%		Retained
	1	Effect of exercise of blood glucose	(9) 81.1%	2 (18%)		Retained
	1	Low fat decreases risk for	(3) 27.3%	(8) 72.7%		Retained
	2	Ideal range of blood glucose	(1) 9.1%	(10) 90.9%		Deleted
INSULIN USERS (3)	1	Low blood glucose	(2) 66.7%	(1) 33.3%		Retained
	1	Skipping meals on insulin	(2) 66.7%	(1) 33.3%		Retained
	1	Causes of high blood sugar	(2) 66.7%	(1) 33.3%	Repetition	Deleted

Table 0-3 Pre-test survey results for diabetes attitudes item analysis

Category Ranking		Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I THINK ITS IMPORTANT FOR	Keeping blood sugar under control	1				10
1		Keeping weight under control				1	10
2		Taking medication/insulin				1	10
1		Exercise					11
1		Follow a prescribed diet					11
1	I FEEL I HAVE THE SKILLS	Keep my blood sugar under control	1	1		1	7
1		Keep my weight under control	1		1	1	8
1		Follow a Diabetes Diet	1	1	2		7
1		My health depends on taking my diabetes medication	1		1	1	8
1		Diet is just as important as medication in controlling blood sugar		1	1		9
1		Traditional Medicines are more effective by doctor prescribed medication	1			1	9
1	My Diabetes and its treatment keep me from	Being as active as I want			3	1	7
1		Eating the foods that I like	1			3	7
1		Eating as much as I like	2	1	1		7
1		In general belief most people can enjoy life and still keep tight blood sugar control			3	1	7

Table 0-4 Pre-test survey results for diabetes practices item analysis

Practices	Never	At least once a month	At least once a week	At least once a day	More than once a day	Other	No Response
Diabetes Diet Frequency of Adherence		2	1	2	6		0
Have you ever been told to weigh or measure food	4	1		5	1		
Have you ever been told to use exchange lists/food group lists	6	4					
How often do you follow a schedule for your meals	3	3			4		1
How often do you check your blood glucose		5	3	1			2
How often do you forget to take your medication/insulin	5	3		1	2	1	
How often do you use traditional medicines	10						
	Never	Atleast once a month	Atleast once a week	Atleast 3 times a week	Everyday	Other	
How often do you exersize			1	2	6	2	
	Yes	No	No response				
Have you ever been told to weigh or measure food	9	2					
Have you ever been told to use exchange lists/food group lists	6	4	1				